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**Further details in SAUNDERS ADVERTISEMENT on Page 3**

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## THE TREATMENT OF ALLERGIC RHINITIS

### WITH PARTICULAR REFERENCE TO IONIZATION AND THE CONTROL OF CHRONIC VASOMOTOR RHINITIS

L. W. DEAN, M.D.; LLOYD D. LINTON, B.S.; H. M. SMIT, M.D.; L. W. DEAN JR., M.D.
AND
CHARLES MAHONEY, M.D.
ST. LOUIS

Twenty months ago the Department of Otolaryngology in the Medical School of Washington University decided to make a study of allergic rhinitis. The late Frank E. Ball of Muncie, Ind., created the Frank E. Ball Research Fund to carry out this study.

Antedating this research, two observations regarding ionization had already been made in the department. McMahon [1] reported that ionization in dogs produced a fibrosis of the subepithelial tissue with marked hyperplastic bone changes; that the epithelial changes in the nose consisted of a primary destruction of cells with a later return to normal. The Alexanders [2] reported that it was the patient who suffered from hay fever and had no reagins in the blood stream who was more likely to get a good result from ionization, while the one who had an abundance of reagins in the blood stream as a rule had an unsatisfactory result following the treatment. Hansel [3] made an excellent and comprehensive review of allergic rhinitis.

A group of scientists, some doctors of medicine and some not, were engaged to further this investigation. This is a report of part of the work done. The immunologic work reported was done by L. D. Linton; the pathologic work was done by and the study of the action of radium and of surgical diathermy on the mucous membrane was made by L. W. Dean Jr.; the study of the action of alcohol and of phenol (carbolic acid) in the nasal mucous membranes of animals was made by Charles Mahoney, the study of the action of trichloroacetic acid and the actual cautery on the nasal mucous membranes by H. M. Smit. Wenner [4] has shown that ionization of the frog's foot slowed the circulation in from eight to fifteen minutes; that a clumping of the red blood cells took place in forty-five minutes; that the circulation was completely stopped in one hour; that if the electric current alone was used the circulation was not stopped and the clumping of blood cells did not take place. Similar observations were made on a rabbit's ear. Wenner studied the influence of zinc iontophoresis on the feet of guinea-pigs and concluded that the resulting ulceration of the skin and gangrene of the feet was probably in part, at least, caused by the circulatory disturbances and made the observation that small electrodes if used in ionization were more likely to cause ulceration than the larger ones.

#### RESULTS OF IONIZATION

Later Wenner [4] demonstrated that so-called ionization was in reality iontophoresis; that the zinc ions actually penetrated the skin and cartilage of the rabbit's ears during the process of ionization.

Linton [5] made intramucosal tests before and after iontophoresis. If the patient gave a positive intramucosal reaction before ionization he always gave a positive reaction after the treatment. Some patients who received relief from allergic rhinitis from the use of iontophoresis did not react to the topical application of allergens to the mucosa, but they always reacted to the intramucosal injection of the ragweed pollen if they were ragweed hay fever cases. He secured a reaction in one case as early as eleven days after iontophoresis. He has since noted that trauma and other procedures in the nose influence the reaction of the mucous membrane to allergens; that is, for instance, the removal of polyps, submucous resection and the like may interfere with the reactions when intramucosal tests are made. He has also noted that local desensitization of the mucous membrane may result from the injection of an allergen. For example, in a case of hay fever in which ionization has been done an intramucosal injection of ragweed pollen was given to test the sensitivity of the mucous membrane. This resulted in a terrific attack of hay fever, which could be controlled only by an injection of epinephrine. A repetition of this injection ten days later produced no reaction. It has been noted many times that intramucosal tests in allergic rhinitis may themselves produce a clinical improvement.

Smit [6] studied the tissue changes following zinc iontophoresis. His observations are as follows:

> Summarizing the tissue changes which one finds following zinc iontophoresis, there occur: coagulative necrosis of the epithelium; early stages of inflammation with polymorphonuclear leukocytes which are later replaced by round cells; atrophy of glands and loss of glands; metaplastic changes in glands and ducts; formation of stratified squamous epithelium

This investigation was made possible by the Frank E. Ball Research Fund.

From the Oscar Johnson Institute, Washington University School of Medicine.

Read before the forty-first annual convention of the American Academy of Ophthalmology and Otolaryngology, New York, Sept. 28, 1936.

1. McMahon, B. J.: Ann Otol., Rhin. & Laryng. **43**: 643 (Sept.) 1934.
2. Alexander, H. L., and Alexander, J. H.: J. Allergy **6**: 240 (March) 1935.
3. Hansel, F. K.: Allergy of the Nose and Paranasal Sinuses, St. Louis, C. V. Mosby Company, 1936.
4. Wenner, W. F.: Ann Otol., Rhin. & Laryng. **45**: 131 (March) 1936.
5. Linton, L. D.: Ann Otol., Rhin. & Laryng. **45**: 163 (March) 1936.
6. Smit, H. M.: Ann Otol., Rhin. & Laryng. **45**: 138 (March) 1936.

which later returns to normal ciliated columnar (if there is not a chronic inflammatory process present); fibrosis of tunica propria; dehydration of edematous tissue; fibrosis of blood vessels, and in some cases cartilaginous necrosis.

Boling,[7] working in the department of cytology at Washington University School of Medicine, showed that following ionization of the sheep's nose there was a complete regeneration of the ciliated epithelium. Wenner has made the same observation on cats. In the human subject, probably because of the fact that we were dealing with chronic inflammation of the mucous membrane in the beginning, we have always found areas of persistent squamous cells following the ionization. Biopsies were made from the same area on the inferior turbinate before and after ionization. Before ionization the cells were all ciliated. One month after ionization no ciliated epithelium was present, the epithelium being all stratified squamous. Three months after ionization the only ciliated epithelium found is in a small depression in the mucous membrane, which may have caused the epithelium at that point to be unaffected by ionization. It is true that the more insult there is to the nasal mucous membrane the more stratified epithelium will be found. Theoretically it is to be expected that, following the necrosis of the superficial tissue that occurs with ionization, there will be more squamous epithelium than before.

During the last year we have been interested in the activity of the cilia of the cells that were regenerated following ionization. One patient had particularly good cilia in the microscopic section of a biopsy after ionization. Some of these cells were removed and studied by Miss Pfingsten. She compared their activity with the activity of the cilia of normal cells and also the length of time that the cilia beat when kept in nutrient solution in the culture chamber following removal. The activity and the length of time that they beat were practically the same in the normal and in the regenerated ciliated cells. This patient had been ionized some eight or ten months before because of a chronic vasomotor rhinitis. The mucous membrane of this patient was much drier than normal. Several members of the staff looked at this patient's nose and all agreed that, while the cilia might be beating in the lower layer of mucus, the mucus covering the membrane was so dry that it was impossible for the cilia to produce any movement on the surface.

We have convinced ourselves[8] that some form of mucosal test is necessary in studying allergic rhinitis. The comparison of the results of intramucosal tests with skin tests shows that often the skin will give a negative reaction for an allergen to which the mucous membrane of the nose is sensitive.[9] It has been found that, by avoiding the allergens to which the mucous membrane is sensitive and to which the skin did not react, a satisfactory result has been secured.

During the last year Wenner and Alexander[10] have made a study of the action of ionization and of the galvanic current on the vasomotor mechanism of the nose. They proved that the blood vessels of the nasal mucous membrane failed to react to vasoconstrictors and vasodilators for six weeks after zinc ionization in the cat's nose and for four weeks after treatment with the galvanic current. They were unable to determine whether this was due to a paralysis of the vasomotor nerves or to a loss of vascular tone. The absorption of drugs by the mucosa was not affected by ionization.

During the last year we have also been interested in the influence of ionization in the nasal mucous membrane on the absorption of allergens by the membrane. Three patients who were ionized because of chronic vasomotor rhinitis were studied before and after ionization in order to determine the relative absorption of allergens through the untreated and treated mucous membrane. The method described by Sulzberger and Vaughan[11] of determining the absorption of allergens through the mucous membrane of the nose was used. These three patients were nonallergic to ragweed. Blood containing reagins to ragweed was injected into the skin of one arm. This produced a local sensitivity to ragweed pollen. A similar amount of blood without the reagins to ragweed was injected into the other arm. The first patient tested had had one side of the nose ionized sixteen days before. Twenty-four hours after the arm was injected, the ragweed pollen was placed in the un-ionized side of the nose. In fifteen minutes there was a reaction apparent on the arm at the site of the injection of the blood containing the ragweed reagin. The other arm did not react. This was repeated on the ionized side of the nose. There was no reaction on either arm in twenty-four hours. The other two patients had the same test made except that the test was made before and after ionization. In the first case before ionization the reaction in the arm started in ten minutes and reached a maximum in thirty-three minutes. Eight days following the ionization, the test was repeated with negative results. In the second case before ionization the reaction started in thirteen minutes after the injection and reached its maximum in one hour and thirty minutes. Twenty-one days after the ionization, the absorption test was again made. The reaction in the arm in this instance started in forty-three minutes and reached its maximum in one hour and forty-three minutes. The reaction following the ionization was more marked than that which preceded it.

We have had the opportunity of studying the influence of ionization on the absorption of allergens by the nasal mucosa in only three cases. It is interesting at least to note that in two cases there was no evidence of absorption at all of the ragweed pollen through the mucous membrane of the ionized nose, while in the third case the absorption was delayed.

Further studies during the last year on the human nose, taking biopsies before and after ionization, have suggested that the final results of ionization were fibrosis and thinning of the tunica propria; that the basement membrane is thicker and more dense; that there is a hyperplasia of the epithelium with increase in metaplasia; that very few goblet cells are present; that sometimes there is a thickening of the vessel walls, particularly the capillaries; that the number of eosinophils in the tissue is not decreased, and that the secretory glands are partially destroyed.

Some of the acini of glands appear to be completely obliterated by cellular hyperplasia. In others the secretory cells are atrophied. Marked inflammation may be present around the acini. These changes result in an

7. Boling, L. R.: Regeneration of Nasal Mucosa, Arch. Otolaryng. **22**: 689 (Dec.) 1935.
8. Dean, L. W.; Linton, L. D., and Linton, C. S.: Ann. Otol., Rhin. & Laryng. **44**: 317 (June) 1935.
9. Linton, L. D.: A Comparison of Intramucosal Tests in Cases of Allergic Rhinitis, Arch. Otolaryng. **23**: 679 (June) 1936.
10. Wenner, W. F., and Alexander, J. H.: The Effect of Zinc Ionization and Galvanic Current on the Reaction of the Nasal Mucosa to Vasomotor Drugs, Arch. Otolaryng., to be published.
11. Sulzberger, M. B., and Vaughan, W. T.: J. Allergy **5**: 554 (Sept.) 1934.

interference with the secretory function of the nasal membrane, and the membrane does not swell as easily as it did before. Biopsies taken from the human nose are necessarily superficial. Periosteal changes have been found in the occasional biopsy in which a piece of bone was secured. In human biopsies the cartilage of the septum could not be studied. In dogs and guinea-pigs, some cartilage cells were killed by the ionization.

We have proved to our satisfaction that ionization does not change the allergic status of the body in any way. While dusting allergens in the nose may not cause a reaction after ionization, the tissues of the nose always react as before ionization to the intramucosal injections of allergens. With intramucosal tests there is a difference; namely, the tissues do not swell as before. There is no change in the reagin content of the blood. It has been found however that, by using different individuals to test the reagin content of the blood and by using the same blood, different results may be secured. This may explain the suggestion that has been made that the allergic status of the individual is changed by the ionization.

We do not find it necessary to use ionization for the control of hay fever. It is used to control the chronic vasomotor rhinitis that persists after the hay fever season. It is interesting to note that we had on Sept. 1, 1936, in our research clinic five patients who were ionized one or two years ago for hay fever with unsatisfactory results. One of these patients is doing very well with desensitization, diet, hormones and the like. The other four are not doing well. The patients who are highly sensitive to ragweed pollen, those who have plus 4 reagins in the blood stream, are very difficult to handle with any kind of treatment except the avoidance of allergens. All other hay fever patients in the clinic are doing well with desensitization, diet, avoidance of other allergens to which they are sensitive, correction of endocrine dyscrasias, and other measures.

We have used ionization for the control of chronic vasomotor rhinitis when other forms of treatment have failed. It has been used when all the mucous membrane of the nose and that on the septum and in the meatuses, as well as on the turbinates, is boggy.

### NECESSITY OF DIAGNOSIS

In treating allergic rhinitis, an exact diagnosis is essential. We have seen patients with edematous nasal mucous membranes in which at first glance we have thought it was allergic rhinitis. Some of these cases after being studied for a year and a half have proved not to be allergic. The only thing that brought about an improvement in the nasal condition was a proper diet plus adrenal cortex extract.

Rackemann [12] states that 50 per cent of the cases of vasomotor rhinitis are nonallergic. Cameron [13] of Glasgow puts it at 40 per cent. These percentages, as we view them, are very high. No one has ever proved that the cases of nonallergic vasomotor rhinitis were not at one time allergic. We had under observation a patient with allergic rhinitis who secured a most excellent result by the avoidance of certain allergens to which she was sensitive and by undergoing a submucous operation. Examination of the nose showed good breathing space; the turbinates, however, were paler and softer than normal. The biopsy of the tissue taken after the treatment showed edematous tissue with no increase of eosinophils in the tissue.

Vasomotor disturbances in the nose may result from infection and inflammation. Even a simple irritation of the mucous membrane causes vasomotor changes. Clinically one must assume that there are many cases of vasomotor rhinitis which are not at the time of examination allergic. Further, it must be realized that many of these conditions will improve with treatment for dietary and endocrine defects.

Repeated attacks of acute allergic rhinitis leave behind a chronic vasomotor rhinitis. During the last year we have seen only one hay fever patient who had a normal mucous membrane. This patient had had only one attack of hay fever. The treatment of allergic rhinitis is so intimately tied up with the treatment of chronic vasomotor rhinitis that the two cannot be separated. We feel that every case of edematous nasal polyps and every case of chronic vasomotor rhinitis should have a complete allergic work up. We have not yet seen a case of edema of the mucous membrane presenting a great increase of eosinophils in the nasal discharge which did not prove to be allergic. On the other hand, we have all seen cases in which, with one or two or three studies of the nasal discharge no increase of eosinophils has been found but further study of the vasomotor rhinitis proved the case to be allergic and a good result was secured by allergic treatment.

Every case of boggy mucous membrane should have not only a complete allergic study but dietary, bacteriologic and endocrine studies. The first thing to do in the treatment of all cases of chronic vasomotor rhinitis is to correct the allergic condition if it is present. Dietary defects and endocrine disturbances should be corrected and infection should be eradicated. If this has been done there will be a certain percentage of boggy noses in which a good result can be secured only by some type of therapy applied to the mucous membrane of the nose.

One of the essential things in the treatment of allergic rhinitis is that the patient should be under the care of a rhinologist. The examination of the nose is necessary for a proper diagnosis. It is only by watching the nose that one gets the best idea as to the result of a given therapeutic procedure. Last and by no means least is the fact that one of the essential factors in the treatment of allergic rhinitis is to bring the nose into as normal a condition as possible. Infection of the nasal sinuses must be corrected. In perennial allergy we often get good results following the correction of deflected septums, the removal of exostoses or the removal of adenoids. Before very much was known about allergy it was known that cases of vasomotor rhinitis were often favorably influenced by the removal of adenoids in children. Most striking results often follow the correction of nasal lesions.

In cases of allergic rhinitis in which the biopsy has shown a typical allergic picture, complete subjective relief with objective shrinking of the mucous membrane of the nose has followed a submucous operation or the removal of adenoids. One might immediately ask the question How long will the patient be benefited? The question might well be answered by asking How long is a patient with allergic rhinitis benefited by desensitization or any other form of treatment? It is often necessary to eradicate a chronic vasomotor rhinitis in order to get the nose normal. In certain cases of

12. Rackemann, F. M.: Clinical Allergy, Particularly Asthma and Hay Fever: Mechanism and Treatment, New York, Macmillan Company, 1931.
13. Cameron, J. A. M.: J. Laryng. & Otol. **50**: 493 (July) 1935.

chronic vasomotor rhinitis, ionization may be used. Its best and most permanent result is secured in chronic nonallergic vasomotor rhinitis. We have observed a patient with chronic vasomotor rhinitis who had one side of his nose ionized. Three months before, the patient had had acute upsets of the upper respiratory tract which were nonallergic. The un-ionized side of the nose was pink, blocked and actively secreting. The ionized side of the nose was dry with good breathing space and the mucous membrane; instead of being pink and actively secreting, it was pale and only slightly moist.

### STUDY OF THE PATIENT

A second essential in the treatment of allergic rhinitis is a most careful study of the patient. With our patients we are definitely of the opinion that, if after careful study we are not getting a good result from treatment, we have overlooked something and the patient must be studied again. It is a common thing in the management of the treatment of perennial cases of allergy for us to go back and restudy the case.

The history is a most important part of the study, and still one must be sure not to be too much influenced by it. The finding of a gastro-intestinal allergy does not make a diagnosis of an allergic rhinitis in the patient if he has an upset of the upper respiratory tract. A patient may have a gastro-intestinal allergy and still have a chronic vasomotor rhinitis which is not necessarily allergic.

Nasal smears and a blood count should be made in every case. It is certain that in trichinosis and other parasitic diseases and in digitalis and other forms of poisoning one may have a great increase in the eosinophils in the nasal discharge without having an allergic rhinitis. At the same time there will be an increase in the eosinophils of the blood. Up to this time we have never seen a patient with an edematous nose and a marked increase in the eosinophils in the nasal discharge who did not prove to be allergic. An exception to this may be found at any time. An x-ray examination of the sinuses should be made, because a thickened sinus lining is always suggestive of an allergic condition.

A bacteriologic examination is most important whether there is definite infection of the nasal sinuses or not. There is such a thing as bacterial allergy. Biopsies of the tissue present the same picture of edema with a great increase in eosinophils, as is found in other forms of allergic rhinitis. If there is any suspicion of bacterial allergy and organisms have been cultured that are suitable for making a vaccine, the tests must await the preparation of a vaccine. Skin reactions and systemic reactions follow the use of vaccine in cases of bacterial allergy. We are inclined to think that the greater the reaction the better the prognosis from the use of a vaccine.

Dietary deficiencies must be sought. One should not put the patient on a diet that is made deficient by excluding certain substances to which the patient is sensitive. It is inexcusable to take from the food supply a given essential food without replacing it with something equally good. This is sometimes a definite problem.

We have proved conclusively in our clinic that we do not get as good results from the administration of vaccines or from the desensitization of patients with allergic rhinitis if the patient is not on a proper diet. Ragweed hay fever patients are sensitive to other substances, particularly foods. Not only are these patients improved by the avoidance of foods and other allergens to which they are sensitive, but a good diet helps with the hay fever.

Trauma of the nasal mucous membrane of the nose and malnutrition both do something to the protective lining of the nose that permits allergens to enter into the tissue. This is the reason there are so many cases of asthma following operations on the tonsils. It is interesting to note that some of these patients have asthma only when they return to the community where the tonsils were removed. The break in the protective epithelium permits the entrance of allergens into the tissue, and sensitization results.

Endocrine disturbances should be sought and, if present, corrected. We have a basal rate determination made in every case of allergic rhinitis. We make skin tests in every case. We realize that they are often more an indication of the past allergic history of the patient than of the present. Reagins are formed in all tissues of the body except the cerebrospinal fluid and the aqueous humor of the eye. As soon as the acute allergic attack is over the organism starts excreting the reagins. They disappear from the blood and other circulating mediums of the body first. The skin is one of the structures from which they disappear last. A child may have been sensitive to milk at the age of 2 years and the sensitivity may have disappeared before the child reaches 2½ years of age and still give a positive skin reaction to milk at the age of 15 years. We would be unwilling to treat cases of allergic rhinitis without some test of the sensitivity of the mucous membrane of the nose to the various suspected substances. We like the intramucosal test. We have done more than a thousand tests without any deleterious results. It is axiomatic that we have not used serums and other similar substances that are very likely to cause severe systemic reactions. There is little or no danger with the various pollens and foods in the proper dilutions. Certainly it is a common occurrence to find the mucous membrane of the nose sensitive to a substance to which the skin does not react.

Passive transfers are not done as a routine procedure. We do them whenever we wish to know just how sensitive a given patient is to a certain allergen. Before we make a passive transfer, careful serologic tests are made. The serum of the patient to be tested is injected into the skin of a nonallergic person. If reagins to ragweed are in the serum used they produce local sensitization at the site injected. At the end of three hours the site of the injection is tested with ragweed pollen and the amount of reaction determines the amount of reagin or antibodies to those allergens in the serum.

The leukopenic index as worked out by Gay has proved to be of the greatest value to us in studying food allergy. The technician doing this work must be capable of making exact blood counts. It takes much of her time. In a number of cases, after a thorough study, if the treatment is not satisfactory and we do not get a good result the leukopenic index to determine food sensitivity is used. The results secured by this procedure, particularly when clinical symptoms are produced, are exact guides for therapeutic purposes. We are aided in the study of our cases by the results that are secured by the withholding of certain allergens or by the symptoms that are produced by their administration.

### TREATMENT

After the completion of our study of the case, the treatment is the avoidance of allergens, desensitization, dietary measures, making the nose normal and, if it is indicated, endocrine therapy.

In connection with desensitization it is well to remember that if a person is made sensitive to one protein he may react to proteins with similar composition. In the same way, in desensitization, using an allergen may desensitize the patient to other allergens with a similar chemical composition.

Getting rid of the chronic boggy edematous nasal membrane that so often complicates allergic rhinitis is a very difficult matter. As we said before, ionization often gives good results. Hollender [14] has used ionization for ten years with good results in intumescent rhinitis.

Ionization may give a good result in patients with a maximum of chronic vasomotor rhinitis and a minimum of allergy. A patient suffered all the year round from nasal stoppage and sneezing. During the hay fever season she was confined to her bed. She worked in an atmosphere containing white flour dust. White flour gave a mild reaction in the nose; there were no reagins for white flour in her blood. The mucous membrane reacted violently to ragweed pollen. She had plus 4 reagins for ragweed in her blood. Ionization controlled her vasomotor rhinitis and gave her an excellent result until the next hay fever season, when she had as much trouble as ever. After the hay fever there was a partial return of her chronic vasomotor rhinitis.

Among other remedies the following have been recommended for the control of chronic vasomotor rhinitis: radium, the cautery, surgical diathermy, 95 per cent alcohol, concentrated phenol and 50 per cent trichloroacetic acid. A study was made of the action of each of these on the tissues with the hope that something as efficient as ionization with a less deleterious action might be found. All the agents mentioned that are said to be beneficial in chronic vasomotor rhinitis act by splinting the membrane. The resulting fibrosis keeps the membrane from swelling.

### RADIUM

A study was made of the use of radium in the treatment of nasal polyps and its effect on the nasal mucosa. Several authors have been prompted to use radium in the treatment of nasal polyps because of the fact that radium stimulates the formation of fibrous tissue. It has been a common observation that the more fibrous a polyp is found to be, the less are its chances of recurring after removal.

The first to use radium for this purpose was Sluder.[15] Others who used this method and modified it in various ways were Lyons,[16] McCullagh and Robinson,[17] Robinson[18] and Scal.[19] The general method used by these authors was to remove the polyps first and then, in from twenty-four to forty-eight hours, to place radium in the nose, using from 150 to 400 milligram hours. Lyons used 400 milligram hours three times (forty-eight hours, eight days and fifteen days after the removal of the polyps) without noting any burning or other harmful effects. The aforementioned authors all found a delay in the recurrence of polyps and all stress treatment of the allergic condition or infection as the only means of complete cure. No detailed microscopic examinations were reported by these observers.

In order to study the changes brought about in edematous polyps by radium we placed 50 mg. of radium in each side of the nose of a patient, leaving it in place for four hours (total dose 200 milligram hours on each side). The polyps became diffusely reddened in three days and there was a profuse mucopurulent discharge. The edema of the polyps and adjacent mucosa was increased. This lasted for two weeks, at the end of which time the polyps were again pale and the same size as before treatment.

Polyps removed before radium treatment were covered by pseudostratified columnar ciliated epithelium lying on a thick pale basement membrane. The stroma was very edematous, and scattered through it were a few lymphocytes, plasma cells and eosinophils.

One week after radium treatment the epithelium was unchanged. The small blood vessels were engorged. In the spaces between the fibers of the reticulum in the stroma was an increased amount of fluid, which stained more deeply with eosin. A much greater number of plasma cells and lymphocytes were found in the stroma. The number of eosinophils was unchanged.

Three weeks after radium treatment, changes in the epithelium appeared. These cells lost their cilia, the nuclei became pyknotic, the cytoplasm was granular and numerous vacuoles appeared. The pseudostratified epithelium was reduced to a single layer of cuboidal cells. In the stroma were young fibroblasts in numbers sufficient to change its appearance entirely. Edema was still present, the fluid in tissue spaces now taking no stain. Plasma cells and lymphocytes were present in large numbers, the eosinophils remaining in the same numbers as before.

Thus we have definite evidence of a stimulation of fibrous hyperplasia in edematous polyps occurring two weeks after irradiation. In addition there is temporary edema and congestion, an increase in the chronic inflammatory cells infiltrating the stroma and destructive cytologic changes in the epithelium.

In order to study the end results of the action of radium on the nasal mucosa, 400 milligram hours of radium was used in one side of a dog's nose. In six weeks the dog was killed and serial sections were made of the snout.

At this point should be mentioned the work of Bernheimer and Cutler [20] and of Bernheimer.[21] They studied the action of radium on the allergic nasal mucosa of human beings and gave detailed microscopic observations and illustrations. The end result was one of fibrosis and loss of edema with no evidence of atrophic or infectious changes in the mucosa.

The only change noted in the dog at six weeks was fibrosis on the treated side. The tunica propria was the same thickness on the two sides but more dense on the treated side. Glands, epithelium, periosteum and vessels remain unchanged, although there may have been temporary changes present earlier.

14. Hollender, A. R.: Arch. Phys. Therapy **15**: 581 (Oct.) 1934.
15. Sluder, Greenfield: Laryngoscope **34**: 124 (Feb.) 1924.
16. Lyons, H. R.: Ann Otol., Rhin. & Laryng. **40**: 249 (March) 1931.
17. McCullagh, Samuel, and Robinson, G. A.: Radium in Polypoid Ethmoiditis, Arch. Otolaryng. **4**: 215 (Sept.) 1926.
18. Robinson, G. A.: Treatment of Polypoid Sinusitis, Arch. Otolaryng. **10**: 72 (July) 1929.
19. Scal, J. C.: Laryngoscope **37**: 735 (Oct.) 1927; Nasal Polypi: Treatment and Prevention of Recurrence, Arch. Otolaryng. **16**: 199 (Aug.) 1932.
20. Bernheimer, L. B., and Cutler, Max: Effects of Radiation on Allergic Nasal Mucosa, Arch. Otolaryng. **16**: 561 (Oct.) 1932; **17**: 658 (May) 1933.
21. Bernheimer, L. B.: Effects of Irradiation on Allergic Nasal Mucosa: Final Report, Arch. Otolaryng. **22**: 165 (Aug.) 1935.

### DIATHERMY

A study also was made of the microscopic changes brought about by the use of the submucous diathermy. The subject of this study was a woman, aged 27, suffering from sneezing and rhinorrhea on an allergic basis. Relief was not obtained by the withdrawal of allergens.

Before diathermy, biopsies of the inferior turbinates showed a mucosa covered with pseudostratified ciliated columnar epithelium with many goblet cells. There were many areas of edema in the tunica propria, especially in the more superficial layers. A dense infiltration of lymphocytes, plasma cells and eosinophils was present. The glands were increased in number.

One month after diathermy, biopsy of the inferior turbinate showed the epithelium to be unchanged. The basement membrane was thicker but less dense than formerly. The inflammatory infiltration was unchanged. In the tunica propria was a dense band of fibrous tissue. Its fibers radiated inward to the fibrous layer of the periosteum and out to the epithelial layer. The epithelium was drawn in, forming a deep fissure on the surface of the turbinate as though by contraction of the scar tissue. The glands in this region were distorted by the scarring.

At the time of biopsy, one month after diathermy, diathermy was repeated on the left side because some edema persisted. A week later another biopsy was taken. The same changes were observed; that is, scarring and loss of edema. In addition there was a metaplasia of the glandular epithelium and the epithelium of the ducts, whole groups of acini being lined by stratified epithelium.

### TRICHLOROACETIC ACID

In London in 1897 it was said that 50 per cent trichloroacetic acid was good to use in rose colds because it paralyzed the end organs of the vasomotor nerves. Norval Pierce used it after the removal of edematous polyps to prevent their return.

A case of chronic vasomotor rhinitis associated with perennial allergy was selected for the study of the action of this drug. Cotton on a probe dipped into 50 per cent trichloroacetic acid was used to make a streak on the medial surface of the turbinate extending from the posterior to the anterior end. At the end of a week the nasal stoppage had disappeared and the patient had a good clinical result, at least for the time being.

Antedating the application of the trichloroacetic acid, a biopsy was taken from the right middle turbinate. Thirteen days following the application of the 50 per cent trichloroacetic acid, a biopsy was taken from the right inferior turbinate. The first biopsy was taken from the middle turbinate and the second from the inferior turbinate in order to obviate changes in the second biopsy due to trauma. The piece removed before the application of the acid showed the following: The epithelium was ciliated and columnar and numerous goblet cells were present; the basement membrane was pale and thickened; the tunica propria was edematous and infiltrated with a large number of eosinophils together with a few plasma cells and lymphocytes; the glands were active; the blood vessel walls appeared normal.

The biopsy taken thirteen days following the application of trichloroacetic acid showed the following: On the margin of the inferior turbinate there was a deep ulceration, the base of which was necrotic. The necrotic tissue and the viable tissue around it were densely infiltrated with chronic inflammatory cells. The epithelium at the edges of the ulceration was stratified and squamous, while that farther away from the ulcer was ciliated. There was a hyperplasia of the fibrous tissue in the region of the base of the ulcer.

### THE ACTUAL CAUTERY

To study the action of the actual cautery, a biopsy was taken of a patient who had been cauterized four months before because of nonallergic vasomotor rhinitis. The patient secured only partial relief from the cautery. To study the immediate action of the cautery, puncture was made of edematous tissue on the middle turbinate of a patient suffering from chronic vasomotor rhinitis, and in another patient an edematous polyp was punctured with the cautery tip. The biopsy through the right inferior turbinate which had been cauterized four months before showed that the epithelium was ciliated. In it there was a depression, at the base of which was an area of dense fibrous tissue. Glands in this region were distorted by scarring but were active. There was no edema in the tunica propria in the region of the scar, although at some distance from it edema was seen.

The edematous tissue on the middle turbinate seven days after the application of the cautery showed that the area not cauterized was covered with ciliated columnar epithelium; the tunica propria was moderately edematous with some infiltration with plasma cells, lymphocytes and eosinophils. At the site of the cautery puncture there was a coagulation necrosis; the surrounding tunica propria was fibrous; there was a metaplasia of cells in the acini of the secretory glands; the blood vessel walls were thickened; around the site of the puncture was an infiltration of a large number of polymorphonuclear neutrophils and a few lymphocytes.

When the edematous polyp was punctured, a large amount of clear fluid escaped from the puncture. Three days after the cautery, grossly, a thick white membrane covered the polyp; the membrane was adherent to the underlying tissue. Microscopically this membrane was a thick exudate covering the area where the epithelium had been destroyed. The surface of the polyp not cauterized was lined by ciliated columnar epithelium. Beneath the exudate there was a marked infiltration of polymorphonuclear neutrophils and there were a few lymphocytes. The lesion produced was one of coagulation necrosis with fibroblastic proliferation in the polyp.

### ALCOHOL

Cats were used for the study of the action of alcohol on the mucous membrane of the nose. The cats were anesthetized by the intraperitoneal injection of 2 or 3 cc. of a 10 per cent solution of sodium amytal. After the nasopharynx was packed off with petrolatum gauze, one nostril was filled with 70 per cent alcohol, which was left in for twenty minutes. Dr. Robert E. Parrish [22] suggested that if alcohol packs were used in the nose for allergic rhinitis they should remain in the nose twenty minutes.

In each case there were sneezing and struggling movements. In about ten minutes a bloody discharge was noted. Cats were killed at various intervals and the nostrils were sectioned and stained for histologic study.

In cats killed two days after treatment, the treated nostril was occluded by a red edematous mucous mem-

22. Personal communication to the authors.

brane and a serosanguineous discharge filled the treated nostril. There was hyperemia and edema to a lesser degree on the untreated side. Microscopic study showed the treated side to be partially denuded of epithelium, especially along the septum. In the recesses between the turbinates, ciliated epithelial cells persisted although the nuclei stained poorly and the cytoplasm appeared granular and cloudy. Cilia were still present. Strips of epithelium were seen to be separated from the tunica propria by serous fluid (bullae). The tunica propria contained massive areas of edema and extravasated blood. The vessels of the tunica propria were markedly engorged. The cells of the mucous glands showed cloudy swelling just as did the epithelial cells when present. No reaction was noted in the periosteum or perichondrium. Between the turbinates and the septum there was a thin serous fluid containing blood pigment and scattered polymorphonuclear neutrophils.

The untreated side showed hyperemia and edema of a small degree. There was some thin acellular serous fluid between the turbinates.

Cats killed three weeks after treatment with 70 per cent alcohol showed, on the treated side, masses of granulation tissue between the turbinates and the septum. This granulation tissue was deeply infiltrated with chronic inflammatory cells (polymorphonuclear neutrophils, lymphocytes and plasma cells). The epithelium covering the turbinates was for the great part missing and, when present, was of the stratified squamous type. The tunica propria was thick; its vessels were engorged. Nothing but skeletal remains of glandular epithelium was seen. The tunica propria was infiltrated with many chronic inflammatory cells. Deep in the turbinates, numerous islands of young proliferating bone could be seen.

The untreated side of the three weeks specimen was entirely normal except for a mild congestion of the small vessels.

At three months in the cats treated with 70 per cent alcohol the only gross difference noted in the treated and untreated sides was a thinning of the turbinates on the treated side. Microscopically, on the treated side, the epithelium was entirely of the stratified squamous type. Comparing the mucosa of the two sides, the treated side was found to be thinner and the tunica propria composed of denser fibrous tissue. The blood supply of the treated side was less; there were fewer glands. The bone and cartilage of the two sides were identical. The picture on the treated side was one of atrophy and fibrosis.

The instillation of 70 per cent alcohol in the noses of cats produced violent congestion and exudation with sloughing of the epithelium. This was followed by the formation of granulation tissue in the nose, a loss of glands, proliferation of bone and metaplasia of the epithelium. In three months' time definite atrophy of the mucosa had taken place.

At the suggestion of Dr. E. C. Bryce,[22] edematous nasal polyps were injected with 95 per cent alcohol, a tuberculin syringe and hypodermic needle being used, or the needle used in the clinic for making intramucosal tests.

Clinically a decrease in size of the polyps is seen as early as the day following the injection. In one instance, two days following injection of a medium sized polyp the patient returned with no polyp tissue visible to be removed for study.

The day after injection, a bright red spot is seen at the site of the injection. An ulcer may form at this point. Part of the polyp sloughs off into the nose and the remaining stump shrinks up to form a small bud of tissue or disappears from sight in the meatus.

The usual pathologic picture of a polyp six or seven days after the injection of alcohol is demonstrated by this case. At the site of injection is an area of complete necrosis, the necrotic area being densely infiltrated with polymorphonuclear neutrophils. The tissue superficial to this area has sloughed off, leaving an ulcerated surface. Around the necrotic area is an area of hemorrhage into the tissues resembling the picture seen in an infarct. Outside this area the tissue is seen to be involved by coagulation necrosis, which diminishes in severity as one leaves the site of injection. Finally, an area of cloudy swelling is seen which may or may not include the remainder of the polyp, depending on its size and the amount of alcohol injected.

### PHENOL

To study the action of concentrated phenol on the mucous membrane of the nose, dogs were used. Dogs were anesthetized with intraperitoneal injections of sodium amytal according to the method of Palmer;[23] their noses were swabbed on one side only with a concentrated solution of phenol. They were killed by air embolism at varying time intervals.

Those killed in two days showed grossly, on the treated side, a small amount of red exudate limited to the parts of the nasal cavity reached by the cotton swab. Microscopically the exudate was serosanguineous. In the region of the exudate the epithelium was denuded, the tunica propria was edematous and contained a small amount of extravasated blood, and the vessels were deeply engorged. Small areas of hemorrhage had separated the tunica propria from the periosteum. On the whole, the reaction was less violent than that seen in cats two days after instillation of alcohol into the nose. In areas not accessible to the phenol swab and on the untreated side, no change whatever was apparent.

Three weeks after the phenol swab was used, much of the epithelium was still absent from the treated side. Where present, it was ciliated. The mucous glands were merely dilated spaces in the tunica propria with no epithelial lining. The vessels were still dilated but did not contain much blood. The bone showed no change. The untreated side appeared normal, as it did at the two day period. Early atrophy with a retarded formation of the epithelium of the glands and mucous membrane seemed evident.

In the three month specimens the treated side was lined by stratified squamous epithelium. The tunica propria was fibrous but more vascular than the untreated side. The stratified epithelium was hyperplastic. Glands were present and appeared healthy. This is inconsistent with the picture of early atrophy seen at three weeks.

### SUMMARY

Swabbing the nasal mucosa of dogs with strong phenol solution resulted in a partial loss of epithelium, a hemorrhagic exudate and engorgement of the mucous membrane limited to the areas in contact with the solution. In three weeks what seems to be early atrophy is present, but at three months there is a definite picture of fibrosis and hyperplasia. Palmer [23] reported that the essential change following the use of phenol was fibrosis of the nasal membrane.

23. Palmer, Arthur: Ann. Otol., Rhin. & Laryng. **44**: 25 (March) 1935.

These observations bring us to the conclusion that if a successful result can be secured in chronic vasomotor rhinitis by treatment on an allergic, dietary or endocrine basis, or by the correction of septal deformities, or by the removal of adenoids or the eradication of infection, the desired result will be secured without deleterious changes in the mucous membrane of the nose. When one resorts to ionization or to the use of phenol, trichloroacetic acid, alcohol, the cautery or any of the methods mentioned in the latter part of this paper, one produces deleterious changes in the nasal mucosa.

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# THE VISCERAL NERVOUS SYSTEM AND ITS RELATION TO THE ENDOCRINES

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Many vegetative functions of the human organism have been shown to be under the influence of the visceral nervous system.[1] It has also been shown that many vegetative functions are under the influence of the endocrine system. At least some of these vegetative functions have been observed to be affected by both systems. These facts have led to various conclusions. By some investigators the visceral nervous system has been given the dominant rôle, while other investigators have relegated the visceral nervous system to a minor rôle, placing the primary importance on the endocrines. On the other hand, statements are not uncommonly found in the literature that suggest a duality of control between these two systems. Zondek[2] says "It should be emphasized that the hormonal system does not, as was supposed by many writers, fulfil the rôle of sole governor of vital functions but that in this respect it is an equivalent link with the nervous system." Jelliffe[3] concludes that "From the evolutionary attitude the vegetative nervous system looks after the chemisms of the human body, hence its function is related to the earliest part of the past in the unconscious denominator. The phylogenetically oldest part of the vegetative nervous system and that part which still maintains the loosest of structural relationships is the endocrinous gland system." I feel that vegetative regulation is the result of a most complicated interdependence between these two systems and offer the following examples to substantiate this point of view:

1. The visceral nervous system does produce an effect on certain endocrine glands. This opinion seems justified in the case of the posterior lobe of the pituitary when the following work of Ranson[4] is reviewed: He and his co-workers have shown that permanent polyuria (diabetes insipidus) could be produced by specific lesions, bilaterally, involving the supra-optic nucleus, the tractus supra-opticohypophyseus, or the posterior or intermedial lobe of the hypophysis. It is usually reasoned that these lesions prevent the antidiuretic principle which is a specific hormone coming from the posterior or intermediate lobe from acting directly on the kidneys to prevent excessive excretion of urine, which diuretic action they show from the diuretic factor produced by the anterior lobe. It is further interesting to note that Ranson[5] has been able to control the polyuria of the nerve lesion by injecting an endocrine product; namely, solution of posterior pituitary. Here, then, is an example of a visceral nervous lesion apparently producing symptoms because of a lack of the hormone being excreted in an endocrine gland, and these symptoms can be relieved when this hormone is readministered to the organism.

Dandy[6] has shown that sympathetic fibers from the carotid plexus accompany vessels down the stalk of the pituitary to the anterior lobe. Kary[7] and Lewy[7] have observed retrograde cell changes in the supra-optic and tuber nuclei of the hypothalamus after injury to the posterior lobe of the pituitary in the dog. Davis,[8] working in Ranson's laboratories, made the following observations: Stimulation of the superior cervical ganglions produces glycosuria and hyperglycemia. If a hypothalamic lesion was previously produced, this effect was not obtained. Furthermore, it was not obtained after bilateral splanchnic section. When to these observations are added those of Houssay[9] in which he was able to control the hyperglycemia of depancreatized dogs by pituitary removal, one may conclude that the pituitary has a distinct effect over carbohydrate metabolism and that this effect may be influenced by the visceral nervous system.

One seems justified in assuming that certain clinical observations reenforce the aforementioned laboratory results. The classic example is the development of exophthalmic goiter following psychic trauma. The observations of de Takáts[10] and others that diabetes mellitus has been frequently influenced by denervation of the adrenals is suggestive of some nervous control over this gland.

2. There is some regulation of the endocrine function by higher centers. The experiments of Ranson would be suggestive of this conclusion. Beattie and his co-workers[11] have been able to show that stimulation of certain hypothalamic centers caused a widespread flow of impulses over the sympathetic system. This would lead to an increase in adrenal output.

3. In some instances, it appears as though a given tissue reaction needs both the visceral nervous system and the endocrine system. The foregoing work not only suggests the probability of central control over certain incretory activity but further suggests the

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1. The terminology used by Livingston (The Visceral Nervous System, Springfield, Ill., Charles C. Thomas, 1935) to include both efferents and afferents of sympathetics and parasympathetics.

2. Zondek, Hermann: The Diseases of the Endocrine Glands, Baltimore, William Wood & Co., 1935.

3. Jelliffe, S. E.: The Psyche and Vegetative Nervous System with Special Reference to Some Endocrinopathies, New York M. J. **115**: 382 (April 5) 1922.

4. Fisher, Charles; Ingram, W. R.; Hare, W. K., and Ranson, S. W.: The Degeneration of the Supraoptico Hypophyseal System in Diabetes Insipidus, Anat. Rec. **63**: 29 (Aug.) 1933. Fischer, Charles; Ingram, W. R., and Ransom, S. W.: Relation of Hypothalamiohypophyseal System to Diabetes Insipidus, Arch. Neurol. & Psychiat. **34**: 133 (July) 1935.

5. Ranson, S. W.: Personal communication to the author, January 1936.

6. Dandy, W. E.: The Nerve Supply to the Pituitary Body, Am. J. Anat. **15**: 334, 1913-1914.

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8. Davis, Loyal: The Relationship of the Hypophysis, Hypothalamus and the Autonomic Nervous System to Carbohydrate Metabolism, Ann. Surg. **100**: 654 (Oct.) 1934.

9. Houssay, B. A.: A Series of Lectures on the Hypophysis, abstr. J. A. M. A. **101**: 1167 (Oct. 7) 1933.

10. de Takáts, Géza: Splanchnic Nerve Section in Juvenile Diabetes, Ann. Surg. **102**: 22 (July) 1935.

11. Beattie, John; Brow, G. R., and Long, C. N. H.: Physiological and Anatomical Evidence for the Existence of Nerve Tracts Connecting the Hypothalamus with Spinal Sympathetic Centers, Proc. Roy. Soc., s. B., London **106**: 253 (May 3) 1930.

interdependence of the visceral nervous system and endocrine system in the responses obtained. A similarity of action between epinephrine response and that of widespread sympathetic stimulation suggests that possibly epinephrine needs the same receptor as does the sympathetic nerve to obtain this response. This is further suspected when one considers Cannon's [12] long list of observations regarding the chemical mediator sympathin, a hormone apparently formed at the nerve ending and capable of giving epinephrine-like response to similarly sympathetic innervated tissue at a distant point. Burget and Zeller [13] have shown that the erosive lesions seen in the small intestine after parathyroidectomy are remarkably less frequent following vagus section. Davis prevented glycosuria and hyperglycemia by splanchnic section. Speculation now becomes tempting. One wonders whether possibly all hormones act by way of the visceral nervous system, particularly their receptors, or are hormones needed for certain visceral nerve responses.

4. The visceral nervous system is affected by the endocrine system. This conclusion is supported by the ingenious work of Cushing.[14] He has observed in the human being that the injection of solution of posterior pituitary intraventricularly produces a response, apparently stimulatory, characterized by widespread vasodilatation, sweating, vomiting and lowering of the body temperature. He further noted that this response could not be obtained in the presence of a lesion which impaired the functional activity of the interbrain, more particularly the hypothalamotuberal portion or after the administration of atropine or the use of tribromethanol, a hypnotic which supposedly acts on the diencephalon.

A second example is afforded by the experiments of Marine,[15] who observed a progressive exophthalmos in young rabbits by the use of cyanide. They believe this phenomenon not the result of thyroid activity but of an increased amount of thyrotropic substance coming from the anterior pituitary, which stimulated sympathetic centers in the hypothalamus. They were able to control the exophthalmos by iodine or thyroxine administration and suggest that a delicate physiologic balance between thyroxine and the thyrotropic principle must be needed.

Clinically, examples are quite numerous to show the effect of glandular dyscrasias on the psychic response of a human organism. Thus, in hyperthyroid activity, apprehension is usually seen; in myxedema, mental sluggishness and emotional torpidity; in tetany, anxiety; in Addison's disease, mental fatigue, and during the menopause or after spaying, mental depression and emotional instability. This array of psychic disturbances is similar at least to the emotional imbalance of the anxiety tension state and is likewise associated with visceral nerve disturbance functions. Thus are seen changes in heart rate, changes in vasomotor response, changes in intestinal activity and changes in sweat gland activity, as well as other symptoms. Who knows how much of this is produced by a direct effect from the disturbed hormone function and how much is produced by the disturbed visceral nervous system?

Jelliffe [3] reports in great detail the case of a housewife who complained of nervousness, tachycardia, increased perspiration and fatigue, giving, in fact, the symptoms of exophthalmic goiter, which condition was diagnosed. However, with painstaking care it was shown that this case belonged in the group of anxiety tension states and her clinical cure was the result not of thyroid therapy but of psychotherapy with relief of the tension state. Such a case is not uncommon and the differential diagnosis may be extremely difficult because of the interdependence of these two systems.

The following is a brief report of a case that came under the observation of the surgical staff at the University of Oregon Medical School:

> A male adult Negro was admitted to the Multnomah County Hospital with a distinct exophthalmos and the customary signs and symptoms of exophthalmic goiter. A subtotal thyroidectomy was performed, following which the symptoms subsided. The patient was not seen again for about six months, at which time he again presented himself with the signs and symptoms of a thyrotoxicosis. His exophthalmos had become more marked, his basal metabolic rate was again high, nervousness and tachycardia were present, but, most bothersome of all, there was a pyloric obstruction, which was verified by x-ray studies. Approximately 1,500 cc. a day was aspirated from his stomach. The patient also complained of intermittent claudication in both arms; that is, muscle pain brought on by exercise and relieved by rest. The gastro-intestinal problem became so acute that the surgical staff contemplated the necessity of emergency surgery for feeding. However, it was finally decided to attempt the thyroid surgery first, and a second subtotal thyroidectomy was done. Following this operation the gastric retention rapidly subsided, being about 300 cc. the following day; it dropped to 150 cc. the next day or so and, after a few days, aspirations were no longer necessary. X-ray examinations were repeated and the pyloric obstruction had entirely disappeared. The intermittent claudication which involved the arms also disappeared, although the exophthalmos progressed and became a very troublesome condition.

This case exhibited three pronounced symptoms that are usually interpreted as of visceral nervous origin; namely, the exophthalmos, the pyloric spasm and the intermittent claudication. Two of these entirely disappeared following an endocrine operation; namely, thyroidectomy.

Some clinical entities seem to be caused by either a lesion of the visceral nervous system or an endocrine dyscrasia. Clinical syndromes are present which may have either an endocrine etiology or a visceral nerve etiology. This conclusion is well demonstrated by the varying opinions offered as to the cause of Fröhlich's syndrome, diabetes insipidus, certain disturbances in carbohydrate metabolism, thermoregulation and pathologic sleep. Apparently the hypothalamic pituitary mechanism is involved in these conditions and at times medical thought has been swayed toward the endocrine side and at times toward the neurologic side.

Perhaps the most classic example is that of pubertas praecox, an unusual clinical entity which has attracted interest over the years. Lisser [16] reports a case in which a boy showed this syndrome; an adrenal cortical tumor was found and successfully removed, with some regression of signs and symptoms. Sutherland [17] reports a case in a boy with similar signs and symptoms in

12. Cannon, W. B.: Chemical Mediators of the Autonomic Nerve Impulses, Science **78**: 43 (July 21) 1933.
13. Burget, G. E., and Zeller, Werner: Relation of the Vagi to Hyperemia and Erosions in the Gastro-Intestinal Tract Following Parathyroidectomy, Am. J. Physiol. **113**: 23 (Sept.) 1935.
14. Cushing, Harvey: Pituitary Body, Hypothalamus and Parasympathetic Nervous System, Springfield, Ill., Charles C. Thomas, 1932.
15. Marine, David: The Exophthalmos of Graves' Disease: Its Experimental Production and Significance, Am. J. M. Sc. **188**: 565 (Oct.) 1934.
16. Lisser, Hans, and Player, L. P.: Adrenal Sexual Precocity, Urol. & Cutan. Rev. **36**: 758 (Nov.) 1933.
17. Sutherland, D. M.: Macrogenitosomia, Brit. J. Surg. **20**: 343 (Oct.) 1932.

which a gonad tumor was responsible for the symptomatology. Laurie [18] has summarized the literature, finding eight instances in which pineal tumors seemed responsible for this syndrome. On the other hand, LeMarquand [19] reports a case in which a boy aged 4½ years had accessory brain tissue connecting with the hypothalamus. Because of these varying etiologic factors producing a similar picture, LeMarquand offers the following hypothesis: "In cases in which the pineal, adrenal, hypothalamus or gonads are involved, they each and all cause pubertas praecox by an influence on the hypothalamic centers and from thence on the pituitary."

Because of these links found in this chain of evidence, I believe that the statement made in the first paragraph of this paper, that vegetative regulation is the result of a most complicated interdependence between these two systems, is more than highly suggestive; therefore the visceral neurologist should have an understanding of the endocrine system, and likewise it becomes necessary for the endocrinologist to have an understanding of the visceral nervous system if the best clinical medicine is to be practiced.

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## ABSTRACT OF DISCUSSION

DR. T. HOMER COFFEN, Portland, Ore.: It is always difficult to appraise contemporary medical thought and trends in a new field, often revolutionary and of absorbing interest, arousing clinical and laboratory investigation and gradually becoming established, with a united attack on it. Our modern concepts of diabetes, with resulting treatment with insulin, our modern concepts of cardiovascular disease leading to better understanding of coronary obstruction and angina pectoris, blood dyscrasia and the modern treatment of pernicious anemia with liver extract are the results of intensive investigation in recent years. All these, perhaps, will go down in history as of epochal importance. Fifteen years ago endocrinology was a field of intensive study. The special journal was voluminous, containing hundreds of contributions. By 1928 it appeared that the subject was almost a closed book. In the meantime, research on the visceral nervous system absorbed interest, and the attack was as intense as on the endocrine disturbances previously. More and more it became evident that there is an interdependence between these two systems. The revolutionary discovery of the gonadotropic hormone in the blood stream in recent years, resulting in a laboratory test for the diagnosis of pregnancy, sought for centuries, opened up many avenues of research and clinical correlation, so that today we find ourselves in a renaissance of interest in endocrinology, correlating its phenomena with the visceral nervous system. From the laboratory come astounding facts to be interpreted in clinical syndromes. One of these is the effort syndrome, or neurocirculatory asthenia. This syndrome presents symptoms of heart disease and disturbed circulatory function in the absence of heart disease. It masquerades to some extent under the guise of thyrotoxicosis, but there is no thyroid disease. It also presents symptoms of neurasthenia. The term effort syndrome acknowledges all these and makes it possible to pigeonhole these cases diagnostically. In the gastro-intestinal tract, pylorospasm or colon spasm are seen as a result of nervous tension exaggerated in some cases by thyrotoxicosis; here one may speculate on the possibility too of adrenal influence. Clinical observations certainly are of equal importance with laboratory experiments, and, from the evidence presented by Dr. Rush, it is perfectly obvious that there is a very definite interdependence between these two systems.

18. Laurie, W. S.: Macrogenitosomia and Other Disturbance of Growth and Development, M. J. Australia **2**: 100 (July 25) 1931.

19. LeMarquand, H. S.: A Case of Pubertas Praecox (Macrogenitosomia Praecox) in a Boy Associated with a Tumor in the Floor of the Third Ventricle, Royal Berkshire Hosp. Rep., 1934-1935, p. 31.

# MECHANICAL DECOMPRESSION OF THE SMALL INTESTINE IN ILEUS

### III. CLINICAL OBSERVATIONS WITH REPORT OF CASES

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The difficulty or impossibility of replacing tremendously or even moderately distended loops of intestine that have been either accidentally or intentionally eviscerated during operation for intestinal obstruction and the danger of producing "waterhose" kinks when rigidly distended intestine is forcibly replaced in the abdomen quite naturally led to the practice of evacuating the contents of distended loops by performing an enterostomy and "milking" or "stripping" out the intestinal contents at the time of operation (fig. 4). The use of stripping has been extended by some to the treatment of intestinal obstruction in which distention is only slight or moderate in degree. Those who have advocated the procedure under such circumstances have felt that the attendant beneficial effects were sufficient to warrant its use as a procedure of election. The practice of stripping the intestine under these less urgent circumstances certainly should not be justified unless it could be established that it is quite safe and not accompanied or followed by immediate or delayed undesirable effects and unless the results obtained are better than those resulting from simple relief of the obstruction.

Conflicting opinions concerning the merit and facility of operative evacuation of distended loops of small intestine have been expressed by clinicians of equal or comparably wide experience in the management of intestinal obstruction. Basing conclusions on their clinical observations and certain theoretical considerations and experimental data, one group strongly advocates such a procedure, whereas other clinicians unequivocally condemn it. The following references are of interest with respect to the development of the procedure and furnish some notable examples of the various estimates of this method of treatment. Monks [1] in 1903 demonstrated that almost the entire small intestine could be puckered or "gathered up" on a 1 foot long segment of a rod introduced into the intestinal lumen. Bottomley [2] credits Monks with suggesting the use of a glass tube introduced through an opening in the bowel for the purpose of evacuating the distended intestine, but, he adds, "in my own experience the successful employment of this procedure is not very easy." Holden [3] believes that the imprisoned intestinal contents above the obstruction should be removed at the time of operation for intestinal obstruction and Van Zwalenburg [4] says:

Does not the procedure of Holden seem reasonable and encouraging? By gently emptying the bowel he relieves the

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1. Monks, G. H.: Intestinal Localization, Tr. Am. S. A. **21**: 412, 1903; Ann. Surg. **38**: 574, 1903.

2. Bottomley, J. T.: Diseases and Injuries of the Jejuno-Ileum and Its Mesentery, in Ochsner, A. J.: Surgical Diagnosis and Treatment, Philadelphia, Lea & Febiger **3**: 77, 1921.

3. Holden, W. B.: Surgical Treatment of Acute Intestinal Obstruction, Surg., Gynec. & Obst. **50**: 184 (Jan., No. 1A) 1930.

4. Van Zwalenburg, Cornelius: Hydraulic Vicious Circle as It Develops in the Intestine; Effect of Intra-Intestinal Pressure on the Pathology and Physiology of the Bowel, Am. J. Surg. **18**: 104 (Oct.) 1932.

circulation, restores normal capillary function more promptly, and removes toxic and infective material. Prompt restoration of adequate circulation is the important result. It is obvious that he must avoid trauma. When carefully done, there should be little shock from this procedure.

According to Moynihan:[5]

No operation for acute obstruction can be considered complete which leaves an intestine, whose function it is to absorb, overdistended by contents of an offensive and poisonous nature. To empty the bowel of its feculent contents is not to add a danger to the operation by reason of the opening and subsequent suture, but to remove, at the cost of a trifling expenditure of time, that condition which makes most speedily for failure.

Although Moynihan[5] does not advocate stripping, he suggests that evacuation of the bowel be accomplished by drawing the distended bowel on to a long glass enterostomy tube, a procedure which in practice frequently involves at least almost as much manipulation of the intestine as does stripping. Cheever[6] contends that the need for the immediate relief of distention is so great that evisceration and evacuation of the contents of the intestine, both in mechanical obstruction and even in some cases of ileus associated with peritonitis, should be done. On the other hand, Läwen[7] showed that the trauma associated with intestinal stripping results in cardiovascular disturbances, particularly fall in blood pressure, and Morton[8] contends that emptying of a distended loop of toxic material, even by the slightest manipulation, causes damage to the friable mucosa, hemorrhage and absorption of toxin. He thinks that stripping the intestine is a very dangerous procedure and has evidence that it acts the same in human cases as it does in animals. Stripping of normal intestine causes carotid blood pressure to fall, but it recovers and in forty-five minutes is normal. When the same thing is done after an ileus of twenty-four hours' duration, he says, the blood pressure falls and shows little tendency to return. A proportion of these animals quickly die.

Whereas the theoretical advantages of relieving intra-intestinal pressure and dilatation of the intestine in ileus cannot be denied, especially when one considers the possibility of accompanying intramural strangulation, it is necessary by careful clinical and experimental investigations to evaluate the advantages of mechanical stripping of the intestine. The intelligent use of duodenal decompression preoperatively, as suggested by Wangensteen,[9] usually will obviate the necessity of such a procedure, but still there are cases in which such preoperative measures are contraindicated or unsuccessful and in which stripping might be used.

In any attempt to evaluate the procedure, some pertinent laboratory and experimental observations must be considered. Blalock[10] states that:

One of the most frequently used methods of producing shock experimentally consists of traumatizing the intestines. In experiments on twelve dogs, this was done by passing the intestines *gently* [italics ours] between the fingers. This was continued until a sustained low blood pressure resulted.

Dragstedt, Lang and Millet[11] have shown that there is considerable variation in the intramural blood supply of various parts of the intestine and, owing to this anatomic variation, intra-intestinal pressures exert varying influences on the blood supply (fig. 1). Kocher[12] in 1899 showed that intra-intestinal pressure might interfere with circulation and cause gangrene of the intestinal wall, and Van Zwalenburg[13] made observations on blood flow in the intestinal wall as affected by varying pressures within the intestinal lumen. The latter concluded:

The demonstration seems complete that distention of the gut (or of other hollow viscera) interferes with the circulation in its wall and allows infiltration and effusion to take place into its wall and lumen and any other open spaces which may come within its influence. The return circulation is retarded at comparatively slight pressures. Effusion follows, as in all obstructions to venous flow. As the average venous pressure in the intestine under ordinary circumstances probably varies from 4 to 10 mm. of mercury, any pressure beyond that will offer some resistance to the return current.

Gatch, Trusler and Ayers[14] showed that the blood flow through the intestinal wall decreased as the distention increased and ceased when the pressure within

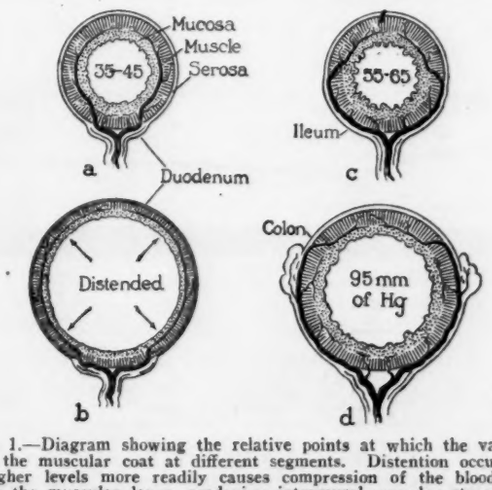


Fig. 1.—Diagram showing the relative points at which the vasa recta pierce the muscular coat at different segments. Distention occurring in the higher levels more readily causes compression of the blood vessels against the muscular layer, producing intramural vascular strangulation. (Modified after Dragstedt, Lang and Millet[11] and Morton.[8])

the intestine equaled the systolic blood pressure. Burget, Martzloff, Suckow and Thornton,[15] working with subcutaneous, closed intestinal loops with intact mesenteries, showed that no clinical manifestations developed unless the pressures in the loops were high and produced vascular disturbances. Morton[8] found that the duodenum secreted from five to ten times as much fluid as the ileum and that, whereas the normal intra-intestinal pressure varies from 2 cm. to 4 cm. of water, after twenty-four hour obstruction the pressures within the duodenum and ileum increase from 28 cm. to 36 cm. and from 4.5 cm. to 5 cm., respectively. Herrin and Meek[16] studied the effect of distention on dogs with varying types of fistulas. They state: "Distention is

5. Moynihan, Berkeley: Abdominal Operations, ed. 4, Philadelphia, W. B. Saunders Company, 1926, vol. 1.
6. Cheever, David: Operative Evacuation of the Small Intestine in Paralytic Stasis, New England J. Med. **207**: 1125 (Dec. 22) 1932.
7. Läwen, A.: Zur Operation des Ileus, Zentralbl. f. Chir. **54**: 1037 (April 23) 1927.
8. Morton, J. J.: The Treatment of Illeus, as Indicated by Clinical Experience and Experimental Studies, Ann. Surg. **95**: 856 (June) 1932.
9. Wangensteen, O. H.: Therapeutic Consideration in the Management of Acute Intestinal Obstruction, Arch. Surg. **26**: 933 (June) 1933.
10. Blalock, Alfred: The Mechanism of the Production and the Treatment of Shock, J. M. A. Alabama **1**: 94 (Sept.) 1931.
11. Dragstedt, C. A.; Lang, V. F., and Millet, R. F.: The Relative Effects of Distention on Different Portions of the Intestine, Arch. Surg. **18**: 2257 (pt. 2, April) 1929.
12. Kocher, Theodor: Ueber Ileus, Mitt. a. d. Grenzgeb. d. Med. u. Chir. **4**: 1899 (cited by Gatch, Trusler and Ayers[14]).
13. Van Zwalenburg, C. A.: Strangulation Resulting from Distention of Hollow Viscera, Ann. Surg. **46**: 780, 1907.
14. Gatch, W. D.; Trusler, H. W., and Ayers, K. D.: The Effects of Gaseous Distention on Obstructed Bowel, Arch. Surg. **14**: 1213 (June) 1927.
15. Burget, G. E.; Martzloff, Karl; Suckow, George, and Thornton, R. C. B.: The Closed Intestinal Loop: I. Relation of Intraloop Jejunum Pressure to the Clinical Condition of the Animal, Arch. Surg. **21**: 829 (Nov.) 1930.
16. Herrin, R. C., and Meek, W. J.: Studies on Intestinal Obstruction, Am. J. Physiol. **97**: 532 (June) 1931.

a strong stimulus to intestinal secretion and in obstruction this must work in a vicious circle." In previous publications,[17] the investigations of Raine and Perry,[18] Henderson,[19] Hotz,[20] Usadel,[21] Hartwell, Hoguet and Beekman,[22] Murphy and Brooks,[23] Stone,[24] the Dragstedts, McClintock and Chase,[25] Gatch,[26] Van Beuren[27] and Hofmann[28] on the effect of distention on intestinal activity and vascularity have been discussed. Whereas theoretically the immediate relief of the intraintestinal pressure and intramural strangulation by stripping of the intestine may seem imperative, it is important to determine the dangers of such a procedure and also whether the subsequent intestinal activity is as great as that which is present after the use of more conservative measures. Although one of us (A. H. S.) had used stripping of the intestine clinically in cases of mechanical ileus, it was considered desirable to obtain additional information concerning the value and dangers of the procedure by experimental observations. In previously reported experiments on dogs,[17] observations were made concerning the comparative effects of stripping of the intestine and simple relief of the obstruction in mechanical ileus. The results of one group of experiments[17a] corroborated Läwen's and Morton's observations as regards the depressing effect on blood pressures (fig. 2). In another group of experiments[17b] the intestinal activities twenty-four hours after either simple relief or stripping of the intestine in mechanical obstruction were determined. The duration of the mechanical ileus varied from twenty-four to 144 hours. It was found that not only was there no greater increase in intestinal activity following stripping of the intestine, as might be surmised because of the relief of vascular disturbances but there was actually less activity than in those animals in which only simple relief of the mechanical obstruction was done (fig. 3).

Fig. 2.—Kymographic tracing illustrating the fall in blood pressure caused by stripping the small intestine of a dog with intestinal obstruction of twenty-four hours' duration. The upper tracing indicates the periods of stripping and the other tracings show the blood pressure changes, the respiratory activity and the time intervals, respectively, from above down.

### ANALYSIS OF CASES

In sixteen clinical cases of intestinal obstruction stripping was used, and the present report is based on an analysis of these cases. All these patients were operated on between 1928 and 1931 before Wangensteen[9] suggested preoperative duodenal decompression, and probably at the present time many of the cases would not present the problem they did at that time. In this group is included one case of adynamic ileus of undetermined cause in which stripping was done in order to facilitate replacement of intestine and closure without causing kinking and because it was thought that immediate evacuation was advisable or even necessary as the only means by which the hydraulic vicious circle could be overcome and intramural vascular strangulation relieved at once. For the same reasons stripping was used in one case in which the preoperative symptoms and signs suggested the presence of a mechanical obstruction but in which at operation a severe enteritis was found, and in two cases of intestinal obstruction associated with peritonitis. As mentioned previously, Cheever[6] also reports having employed the procedure in cases of intestinal obstruction associated with peritonitis. The causes of ileus in the other twelve cases were as follows: bands, three cases; carcinoma of the cecum, two cases; adhesions, fecalith, inguinal hernia, ventral hernia, volvulus, and obstruction due to constriction by an acute suppurative gangrenous appendix, each one case. Stripping was employed also in one case in which the condition of the patient was very poor but in which immediate relief of intramural vascular strangulation by stripping in addition to performing a jejunostomy seemed imperative. The cause of obstruction in this last case was not revealed during the procedure of stripping, and further exploration was not considered advisable.

There were ten males and six females. Five of the patients were white and eleven were Negroes. The average age was 41 years, the oldest being 71 and the youngest 9 years old. The duration of the intestinal obstructions averaged 62.8 hours, with the shortest duration 24 hours and the longest duration 120 hours.

Cramping pain, nausea and vomiting were complained of in all cases except in the one presenting adynamic ileus. Stercoraceous vomiting occurred before or shortly after admission in five cases in which the average duration of obstruction was fifty-eight hours. Purgation before admission had been attempted in three cases, all of which ended fatally. Eight patients received enemas or flushes before admission, six of whom died and two recovered.

### PAST HISTORY

There was a history of previous abdominal operation in seven cases, three of which were simple laparotomies. One was an exploratory laparotomy, one an

17. (*a*) Storck, A. H., and Ochsner, Alton: Mechanical Decompression of the Small Bowel in Ileus: I. Effect of Stripping on Blood Pressure, Arch. Surg. **33:** 664 (Oct.) 1936; (*b*) II. Effect on Intestinal Activity, ibid. **33:** 670 (Oct.) 1936.

18. Raine, Forrester, and Perry, Margaret C.: Intestinal Obstruction: Experimental Studies on Toxicity, Intra-Intestinal Pressure, and Chloride Therapy, Arch. Surg. **19:** 478 (Sept.) 1929.

19. Henderson, V. E.: Studies in Peristaltic Fatigue, Am. J. Physiol. **66:** 380 (Oct.) 1923.

20. Hotz, G.: Beiträge zur Pathologie der Darmbewegungen, Mitt. a. d. Grenzgeb. d. Med. u. Chir. **20:** 257, 1909.

21. Usadel, W.: Die Kreislaufstörung bei der freien eitrigen Bauchfellentzündung und der Einfluss der Darmbewegung auf den Pfortaderkreislauf, Arch. f. klin. Chir. **142:** 423, 1926.

22. Hartwell, J. A.; Hoguet, J. P., and Beekman, Fenwick: An Experimental Study of Intestinal Obstruction, Arch. Int. Med. **13:** 701 (May) 1914.

23. Murphy, F. T., and Brooks, Barney: Intestinal Obstruction: An Experimental Study of the Causes of Symptoms and Death, Arch. Int. Med. **15:** 392 (March) 1913.

24. Stone, H. B.: The Clinical Application of Experimental Studies in Intestinal Obstruction, Am. J. Surg. **1:** 282 (Nov.) 1926. Stone, H. B., and Firor, W. W.: Absorption in Intestinal Obstruction: Intra-Intestinal Pressure as a Factor, Tr. South. S. A. **37:** 173, 1924.

25. Dragstedt, L. R.; Dragstedt, C. A.; McClintock, J. T., and Chase, C. S.: A Study of the Factors Involved in the Production and Absorption of Toxic Materials from the Intestine, J. Exper. Med. **30:** 109 (Aug.) 1919. Dragstedt, L. R.: Blood Chemistry in Intestinal Obstruction, Proc. Soc. Exper. Biol. & Med. **25:** 239 (Jan.) 1928.

26. Gatch, W. D.: The Blood Chemistry, Toxemia, and Mechanism of Advanced Intestinal Obstruction with Deductions on Treatment, Illinois M. J. **60:** 236 (Sept.) 1931.

27. Van Beuren, F. T., Jr.: The Mechanism of Intestinal Perforation Due to Distention, Ann. Surg. **83:** 69 (Jan.) 1926.

28. Hofmann, M.: Das Verhalten des Darmes bei Incarceration, insbesondere an den Schnürfurchen, Beitr. z. klin. Chir. **54:** 85, 1907.

appendectomy and one an umbilical hernioplasty. The length of time elapsed since the previous operation varied from two days to fifteen years. There was a definite history of previous peritonitis in two cases, caused in one instance by a ruptured appendix and in the other by pelvic disease. One patient gave a history of severe trauma to the abdomen thirty years previously.

### SIGNS

Abdominal distention was severe in most of the cases and in one of the cases presenting adynamic ileus was of such degree that there was no abdominal movement during respiration. In several cases the abdomen presented a corrugated appearance owing to the underlying distended loops of intestine.

Tenderness of the abdomen was noted in nine cases and abdominal rigidity was present in four cases. Both these signs were present in one of the cases in which there was associated peritonitis.

Peristaltic activity was audibly or palpably detected in five cases.

The average preoperative temperature was 99.3 F., with a range from 97.2 to 102.6 F. The preoperative pulse rate averaged 99 beats per minute, with a range from 52 to 140.

The average respiratory rate was 26 per minute, with a range from 20 to 40 per minute.

### LABORATORY EXAMINATIONS

Pronounced concentration of the blood, indicated by high red blood cell counts and high hemoglobin values, was observed in four cases, all of which ended fatally. The carbon dioxide combining power of the plasma for the entire group averaged 50.3 volumes per cent and varied between 76 and 26 volumes per cent. Both patients who manifested these extremes of carbon dioxide combining power lived. There were four cases in which the carbon dioxide combining power was above 50, and three of these patients died. The carbon dioxide combining power was below 50 volumes per cent in four cases, two of which ended fatally.

The blood nonprotein nitrogen was above 30 in eleven cases, the values varying from 34 to 300 mg. per hundred cubic centimeters of blood. The average nonprotein nitrogen in the survival group was 56 and that in the fatal group 133. The highest nonprotein nitrogen recorded in a survival case was 87.

Blood chloride determinations ranged from 363 to 774, with an average of 472 mg. per hundred cubic centimeters of blood. The average blood chloride content in the survival group was 587 mg. and that for the fatal group was 469 mg. per hundred cubic centimeters.

Albumin was present in the urine in five cases in the entire group. Only two of the patients having albumin in the urine lived. Pus cells were present in the urine of two patients, both of whom lived. Casts were present in four cases, three of which were fatal. Indican was present in one case, and this patient died.

Preoperative x-ray studies consisting of plain films taken with the patient either erect or lying on the side were made in nine cases. Four of these patients lived and five died. Barium sulfate enemas were not employed in any of these cases and in none of these was barium given by mouth. The average amount of time elapsing between the onset of obstruction and the making of the x-ray examination was fifty hours. Diffuse gas accumulation was noted in two cases, both of which were fatal. In no instances in this group were localized accumulations of gas alone found. There were localized or moderately pronounced fluid levels in two cases, in both of which survival occurred, whereas in six cases in which fluid levels were pronounced and diffuse there were five deaths and only one survival. In only seven of the nine cases in which plain plates were made was the extra evidence of obstruction quite definite.

A small stomach tube or Jutte tube was introduced preoperatively in twelve cases. In seven of these cases gastric lavage was done. In one case the tube was aspirated at intervals and in four cases the tube was simply allowed to hang over the side of the bed to permit evacuation of stomach contents by simple siphonage. Ten of the patients on whom some type of preoperative gastric drainage was done died and two lived. Hypodermoclysis or phleboclysis was used preoperatively in each case.

### ANESTHESIA

Spinal analgesia was employed in eight cases with six deaths. In seven of these cases procaine crystals dissolved in spinal fluid were used and in one instance a preparation of procaine with strychnine sulfate was used. Local analgesia was used for four patients, all of whom were in extremely poor condition, with three deaths. Ether was administered to three patients with one death. One patient who received ethylene anesthesia died.

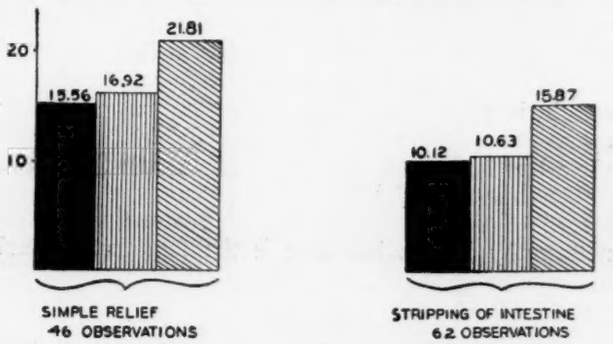


Fig. 3.—Comparison of the degree and character as well as of the duration of intestinal activity in ileus treated by simple relief of obstruction and by relief of obstruction plus stripping. The black area denotes the average increase in tone in millimeters, the vertical shading the average increase in amplitude in 0.1 mm., and the oblique shading the average duration of activity in minutes.

### OPERATIVE RESULTS

A definite and complete absence of peristalsis was recorded in two cases, both of which were fatal. Discoloration of the intestine was present in four patients, only one of whom survived. Mesenteric thrombosis was present in one fatal case. An excessive amount of clear peritoneal fluid was recorded in one fatal case, but this finding was present in several other cases in which no specific notation of such a condition was made. Peritonitis was present in three patients, one of whom survived. Edema of the intestine was definitely recorded in only one fatal case. The degree of distention, recorded as 1, 2, 3 or 4+, averaged for the entire group 2.8+. The average degree of distention for the survival cases was 2.6+, whereas that for the fatal group was 3.0+. The average duration of operation in seven cases in which it was recorded was sixty-five minutes.

### OPERATIVE PROCEDURE

The operative procedure used, aside from division or resection of bands and adhesions or reduction of her-

nias, consisted of performing an enterostomy by introducing a No. 32 Pezzar catheter into the intestinal lumen and evacuating the intestinal contents by beginning in the region of the ligament of Treitz and stripping the entire small intestine. In order to prevent spillage, a single or double row of purse string sutures was employed to coapt the intestine tightly around the Pezzar catheter at the site of the enterostomy, and a moistened laparotomy sponge was held tightly pressed against the point at which the catheter entered the intestine. In order to minimize shock from the exposure of the intestine, the eviscerated loops of bowel were kept covered as much as possible by means of moist warm sponges.

Multiple intestinal obstructions were present in two cases. In one instance resection of the small intestine followed by side-to-side anastomosis was done. In one case with fixation of the ileum to the posterior abdominal wall with resulting angulation it was deemed inadvisable to attempt to detach the ileum, so an ileoileostomy was done. Appendectomy was done in one case in which the inflamed appendix lay across and compressed the terminal ileum.

Whereas in most instances the enterostomy tube was removed after evacuation of the intestinal contents and the opening in the intestine closed by a double row of sutures, in six instances the catheter was allowed to remain in place to serve as an enterostomy following operation. In three instances the catheter thus left in place had been introduced into the ileum and in two instances into the jejunum. In one case there was no record of the location or site of enterostomy. Also noteworthy in this last case is the fact that a Paul tube was used instead of a Pezzar catheter.

### POSTOPERATIVE TREATMENT

A heat tent was placed over the abdomen of eight patients. In most instances it was allowed to remain in place for at least the first five or six postoperative days. Hot turpentine stupes were applied to the abdomen in one case.

Morphine was given postoperatively to eight patients. Fluids were administered subcutaneously and intravenously to all.

### POSTOPERATIVE COMPLICATIONS

Postoperative adynamic ileus was recorded in two cases, in one of which survival occurred while death occurred in the other. Gastric dilatation was a postoperative complication in one fatal case. Acidosis (carbon dioxide combining power 23 volumes per cent) occurred postoperatively in one fatal case. Pneumonia (postoperative) occurred in one fatal case. Delirium and coma were each recorded as postoperative complications. All these patients except the one having postoperative delirium died. Two patients had infected wounds and one had an axillary cellulitis and cystitits, but these three survived.

An indwelling gastric catheter was employed postoperatively in twelve cases. In eight instances postoperative gastric lavage was performed and three of these patients lived, whereas five died. In two instances repeated aspirations through the Jutte tube was done, with one survival and one fatality. In two instances the tube was allowed to hang over the side of the bed for the purpose of permitting emptying of stomach contents by simple siphonage. Both these patients died.

The average stay in the hospital was thirteen days. Hospitalization in the survival cases averaged thirty-two days, whereas that in the fatal group was three and a half days.

### MORTALITY

Of the sixteen patients in whom stripping of the intestine was done, five (31.2 per cent) lived and eleven (68.7 per cent) died. The average duration of obstruction in the group that lived was fifty-one and a half hours, whereas that in the fatal group was 68.4 hours. A mortality rate of 68.7 per cent is prohibitively high, but this probably cannot be considered as being due to the type of operation in all instances, because each patient in the group was a very poor operative risk when admitted to the hospital. Granted that the mortality rate in this group of cases would have been high irrespective of the procedure employed to relieve the obstruction, we believe that the additional trauma caused by intestinal stripping further aggravated the ileus and also caused surgical shock. At least the stripping, with its increased danger of infection, did not improve the condition of the intestine enough to lower the mortality rate. This belief is also corroborated by our experimental observations, in which it was demonstrated that the intestinal activity twenty-four hours after intestinal stripping was actually less than that in control animals in which there had been simple relief of the obstruction.

One death occurred on the operating table shortly after stripping the intestine, and in several instances the patients never recovered from the operative shock, which was precipitated or exaggerated by the stripping.

### COMMENT

Whereas closure is facilitated and there is no immediate postoperative distention when the intestine has been emptied by stripping, we believe that the blood pressure lowering effect, the impairment of intestinal muscular tone and peristaltic activity, and the danger of peritoneal contamination incident to the procedure more than outweigh its good effects. For these reasons we contend that stripping should seldom be employed. Even when most carefully done, the necessary manipulation of the intestine causes considerable shock and local trauma, the latter being evidenced by subserous hemorrhages such as we have observed in some of our own cases, despite most careful handling of the intestine.

We believe that stripping is to be especially deprecated in cases of adynamic ileus without associated mechanical obstruction and in cases of mechanical obstruction with associated peritonitis.

We further believe that the institution of preoperative measures such as the replacement of electrolytes, administration of heat to the abdomen, administration of liberal doses of morphine, and employment of an indwelling gastric catheter attached to suction apparatus will in most instances relieve the excessive intestinal distention and intramural strangulation. Intestinal stripping is not indicated for a patient who has been so prepared. In the case in which relief of distention cannot be obtained preoperatively, we believe that stripping of the intestine should seldom if ever be done because, as shown by our clinical and experimental investigations, the results following stripping are no better than those following simple relief of the obstruction, whereas the untoward effects are greater following the former procedure.

## SUMMARY AND CONCLUSIONS

1. The relief of intestinal distention in mechanical and adynamic ileus is desirable because of the beneficial effects of such a procedure on the blood supply of the intestine.

2. Stripping of the intestine during the operative relief of the obstruction will empty the intestine of its contents.

3. As shown by clinical and experimental observations, this procedure is attended with considerable risk, especially the danger of producing shock, contamination and injury of the intestinal wall.

4. The ultimate activity of the intestinal musculature is no better and in experimental observations is actually less marked in those cases in which stripping has been used than in those cases in which simple relief of the obstruction is employed.

5. Careful preoperative preparation of patients with ileus by means of duodenal decompression, replacement of electrolytes, and liberal doses of morphine in most cases will relieve the excessive intestinal distention and intramural strangulation.

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## ABSTRACT OF DISCUSSION

DR. WILLIS D. GATCH, Indianapolis: The value of this paper is in the exposition of the disastrous results of radical operation for advanced bowel obstruction. The intestinal mucosa possesses a power of selective absorption, which enables it to permit the passage into the blood of substances beneficial to the body and to prevent the entrance of poisonous materials. Many substances produced by the action of digestive ferments of bacteria on the contents of the normal or obstructed bowel are intensely toxic when introduced directly into the blood stream. The mucosa holds them back. It does so in the presence of intestinal obstruction as long as it is alive and uninjured. The operation of bowel stripping must certainly injure the mucosa and thus cause the absorption of toxic material. The complete drainage of this material by the operation is obviously impossible. The chief cause of the appalling death rate of intestinal obstruction has been the practice of subjecting patients to radical operation before they have been properly studied and prepared. Our present knowledge of bowel obstruction justifies the conclusion that the condition of a patient with intestinal obstruction is never so urgent as to justify the omission of complete preoperative study and treatment. This applies especially to the apparently advanced cases. They should not be treated as immediate surgical emergencies. I suggest the following plan of management: 1. The administration by intravenous injection of enough salt solution and dextrose to relieve dehydration and lack of nourishment. 2. Continuous gastric lavage by means of a nasal tube connected to a siphoning apparatus. 3. A thorough diagnostic study of the case, including a roentgenogram of the abdomen taken after the administration of a barium sulfate enema. If it is at all possible, the cause, site and state—whether early or late—of the obstruction should be determined. 4. The administration of enough morphine to relieve the patient of pain and apprehension. Morphine causes tonic contraction of the bowel and thus aids its decompression. These measures can be carried out simultaneously without disturbing the patient or removing him from his bed. This treatment will produce a great improvement in the condition of all but moribund patients. It is sufficient to relieve the obstruction in many instances. In all cases it will at least make the patient a much better operative risk. The treatment outlined has been planned to correct the local and systemic derangements caused by bowel obstruction. It reduces the peril of radical operation by deferring it until the systemic circulation is normal, until the site and cause of the obstruction are fairly well known, and until the danger of manipulating distended and fragile loops of bowel is past.

DR. OWEN H. WANGENSTEEN, Minneapolis: I find myself in accord with the expressions of the authors. My displeasure with the method of stripping the bowel arises largely from the inability of preserving absolute asepsis throughout such a procedure. The most fundamental requisite for a successful issue is that the sterility of the peritoneum be preserved inviolate. The minutest escape of intestinal contents is synonymous with failure. The forbidding mortality of the operative treatment of bowel obstruction is due in large measure to lack of regard for the importance of this factor. The time has come to speak of the mortality of the disease and the mortality of treatment. My practice in dealing operatively with late cases of simple obstruction has been to do an enterostomy; it has been my experience that, if a vent for drainage can be established in this manner without spillage, a successful issue can be predicted. Operations of election are not well tolerated by patients with acute obstruction. An x-ray film of the abdomen gives reliable information as to where the obstruction will be found. Similarly, in the colon, aseptic decompression is the first consideration. Such patients are to be identified preoperatively by the great distention frequently unaccompanied by vomiting and by the absence of gastric retention. The x-ray film indicates the degree and extent of the distention. I decompress such patients through a short transverse incision made directly over the transverse colon. As the authors have said, a number of patients may be satisfactorily managed without recourse to surgery, through the employment of suction applied to an inlying duodenal tube. In the main, however, the use of this therapeutic expedient as a sole therapeutic agent must be limited to instances of physiologic and adhesive types of obstruction. In its employment it is necessary to exclude instances of acute obstruction of the colon with great distention as well as strangulating types of obstruction. It is also important to follow the progress of the distention with subsequent x-ray films to be certain that the bowel is actually being decompressed. The need for the administration of enough para-oral fluids to insure an adequate daily urine output (from 700 to 800 cc.) is obvious. The significance of distention in the ill effects of bowel obstruction and the importance of decompression as a relief measure have become so apparent that I believe the time has come to change the adage concerning the danger of the high obstructions to read: The low obstructions are the most serious, for they carry the greatest hazard for the bowel wall. In saline solution, a good substitute is available for the fluids

Fig. 4.—Method employed to empty the small intestine by stripping after introduction of a Pezzar catheter, the eyelets of which have been enlarged.

lost by vomiting in the high obstructions. Adequate and aseptic decompression is the only therapeutic measure that can favorably influence the low obstruction.

DR. ALTON OCHSNER, New Orleans: I didn't give Dr. Gatch credit for his contribution on the importance of intra-enteric pressure. This is something which has not been sufficiently appreciated in the past. Van Zwalenburg was the first to call attention to it. Wilkie has emphasized the importance of it in the obstructive type of appendiceal disease, and Gatch and his co-workers have done a great deal with this work. I agree with Dr. Gatch that enterostomy is seldom necessary with the use of these other preoperative measures, particularly the transduodenal decompression and the use of large doses of morphine. We have been using oxygen for a number of years, believing that it prevented anoxemia in individuals who receive large doses of morphine. Dr. Fine of Boston has shown recently that the inhalation of oxygen is of distinct benefit in aiding in the elimination of gas from the intestinal lumen, and I am sure that the results obtained from the inhalation of oxygen is largely due to this mechanism. The individualization in these cases is of the utmost importance, and there is no set rule that can be laid down. Possibly there still will remain some few cases in which a general "stripping" might be necessary, but they certainly represent the exception and not the rule.

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## ANOMALIES AND FRACTURES OF THE VERTEBRAL ARTICULAR PROCESSES

WILBUR BAILEY, M.D.
LOS ANGELES

Fissures across the vertebral articular processes may be formed by the presence of an ununited accessory center of ossification opposite the tips of the articular processes, or they may be the result of fracture of the articular processes. The differentiation between these anomalies and isolated fractures of the vertebral articular processes can nearly always be made, but even in the literature considerable confusion exists in making the distinction, and anomalies have been mistaken for fractures. If proper value is given to the history of the injury and to the appearance in the roentgenograms, such mistakes are preventable.

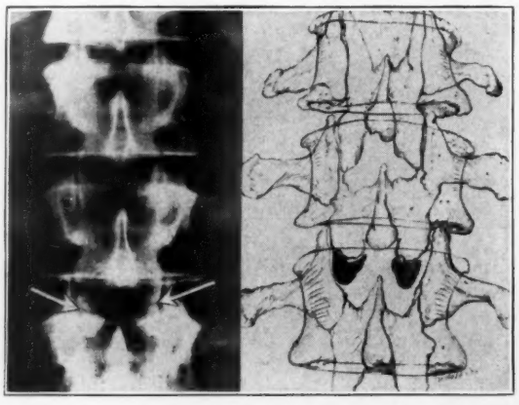

Fig. 1 (case 1).—H. H., aged 40, a laborer, fell from a scaffold, complained of transient numbness of the extremities and pain in the back. Symptoms disappeared soon. Anomalous fissure formation through tips of both inferior articular processes of second lumbar vertebra.

### ANOMALIES

Much more common than fractures are the fissures due to anomalies which arise because of an accessory center of ossification opposite the tip of an articular process in the lumbar region. Such fissures are usually transverse, well demarcated and often bilateral or multiple. There are, however, variations which are shown in the present series of cases and which depend for their appearance on whether or not partial fusion has occurred between the accessory center of ossification and the tip of the articular process and, if so, how much. The commonest location is at the tips of the inferior articular processes of the second and third lumbar vertebrae, but nearly any lumbar vertebra may be so affected, as is indicated by the present series of cases.

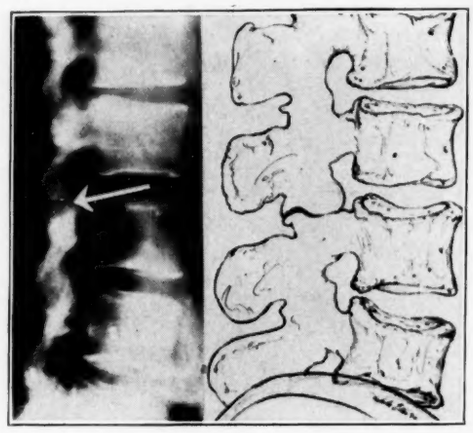

Fig. 2 (case 1).—Lateral view. The anomalous fissure formation can often be seen in this position.

The etiology of this anomalous fissure formation has been attributed by various authors to at least three possibilities. Müller [1] first considered these fissures as "umbauzonen" by which he meant to imply that they were like the fairly well delineated areas of rarefaction which he had found in spinous processes that bordered on a tuberculous lesion in the spine. In this and other locations in which there was abnormal strain on a spinous process, the bone of the process reacted by showing a well delineated transverse line of rarefaction. At a slightly later date, Grashey [2] called attention to this articular process fissure phenomenon and described

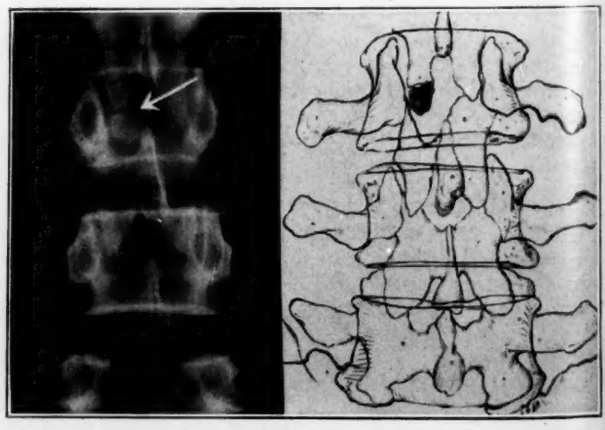

Fig. 3 (case 2).—G. B., aged 28, a laborer, gave a history of having wrenched the lower part of the back while lifting. Persistent pain in the lower part of the back. Anomalous fissure at right inferior articular process of second lumbar vertebra.

From the Department of Radiology, University of Southern California School of Medicine.
Read before the Section on Radiology, at the Eighty-Seventh Annual Session of the American Medical Association, Kansas City, Mo., May 14, 1936.

1. Müller, Walther: Spaltbildungen an Gelenk und Dornfortsatzen der Wirbelsäule auf der Basis von Umbauzonen, Fortschr. a. d. Geb. d. Röntgenstrahlen **44**: 644-648 (Nov.) 1931.
2. Grashey, R.: Discussion at 22d Kongress der Deutschen Roentgen-Gesellschaft, Fortschr. a. d. Geb. d. Röntgenstrahlen **44**, preliminary page 47 (Aug.) 1931.

correctly an appearance resulting from the presence of an accessory center of ossification.

Meyer and Forster,[3] describing a case in the Belgian literature, entertain the question as to whether there are not epiphyses normally appearing at the tips of the articular processes early in life. If this should be the case, failure of fusion might reasonably be expected to occur occasionally. Whether such epiphyses regularly occur in early life does not appear to be of great importance for, as pointed out by Mardersteig,[4] Reisner [5] and others, accessory centers of ossification occur with considerable frequency opposite the heads of the ribs and opposite the tips of the spinous processes as well as opposite the tips of the transverse processes. With such anomalous ununited epiphyses in mind it seems not illogical, especially in view of the frequent bilaterality of the anomalies at the tips of the inferior articular processes, also to consider them as ununited epiphyses. That these cases are merely accessory bones in the same class as the os trigonum, which appears so frequently opposite the dorsal lip of the astragalus, is the opinion expressed by Rendich and Westing,[6] who believe that

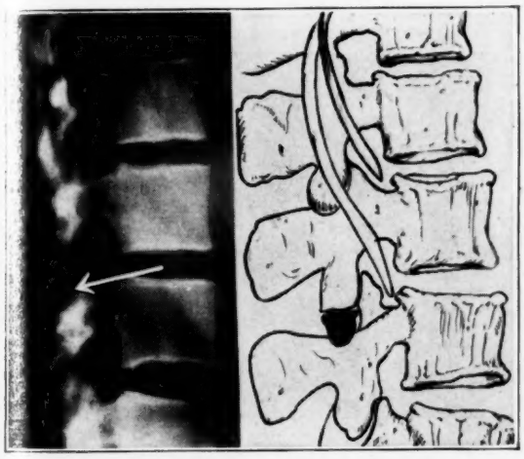

Fig. 4 (case 2).—Lateral view. The anomalous fissure shows clearly in this view.

because of this etiology the name accessory articular process (processus accessorius articularis) would be appropriate.

Of much more importance than the etiology of these anomalies is their differentiation from fracture. As with anomalous epiphyses anywhere else, the cortex is as well delineated opposite the opposing bony surface as it is in the periphery of the epiphysis. Not only is the delineation sharp but the fissure is usually well defined (in those cases in which there has not been partial fusion) and often it is to be found with a reasonable degree of symmetry on both sides. These facts were recognized by Nichols and Shiflett [7] and by Fulton and Kalbfleisch [8] as well as by the others who have already been quoted as having described cases of this anomaly. The importance of not making a diagnosis of "old fracture" unless there is a definite history of the type of injury described in the discussion on fractures has not been so generally appreciated, however. One author [9] is therefore found describing five cases of "isolated fractures of the articular processes of the lumbar vertebrae" in which the first case involves the tip of the superior right articular process of the

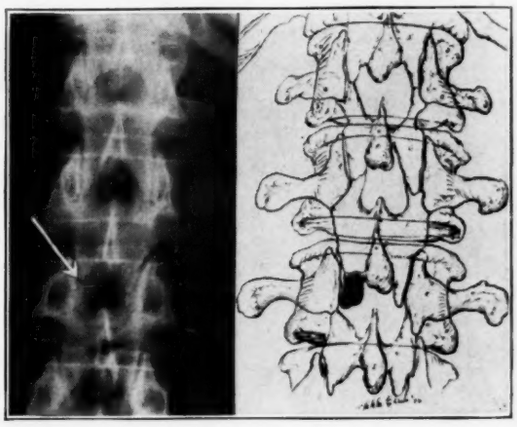

Fig. 5 (case 3).—A. M., aged 48, a physician, with no history of trauma, complained of urinary calculus. Anomalous fissure, right inferior articular process of the second lumbar vertebra.

third lumbar vertebra. The history of a twisting injury is definite, and the case seems definitely one of fracture. With the remaining cases the situation is somewhat different, however, for in three of them bilateral lesions were found and in none was there a history of trauma such as seems to be necessary to produce isolated fractures of the articular processes. There is also nothing about the radiographic appearance of these cases to differentiate them clearly from anomalies.

### FRACTURES

Fractures of the articular processes in combination with severe injuries of the spine in which there is an actual dislocation of one vertebral body on another are not at all unusual. One or more articular processes are frequently sheared off under such circumstances.

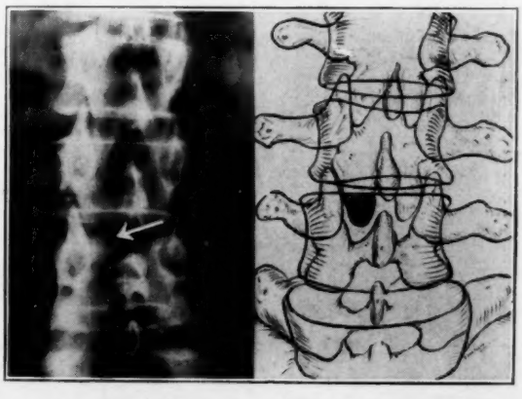

Fig. 6 (case 4).—J. M., aged 28, a carpenter, with no history of trauma, complained that he had swallowed nails. Anomalous fissure at tip of right inferior articular process of third lumbar vertebra.

Isolated fractures in which the vertebral bodies alone are involved, however, constitute a rarity. Burk reported such a case in 1908 in which the right inferior articular process of the fifth lumbar vertebra was fractured. In 1923 Koch [10] recorded a case in which

3. Meyer, M., and Forster, E.: Arrêts de développement d'une vertèbre lombaire pouvant prêter à confusion avec une fracture vertébrale, Scalpel **86**: 1344-1347 (Sept. 2) 1933.
4. Mardersteig, K.: Fortschr. a. d. Geb. d. Röntgenstrahlen **46**: 441-449 (Oct.) 1932.
5. Reisner A.: Unterscheidungsmerkmale normaler, entzündlicher und posttraumatischer Zustände an der Wirbelsäule, Fortschr. a. d. Geb. d. Roentgenstrahlen **44**: 726-751 (Dec.) 1931.
6. Rendich, R. A., and Westing, S. W.: Accessory Articular Process of Lumbar Vertebrae: Differentiation from Fracture, Am. J. Roentgenol. **29**: 156-160 (Feb.) 1933.
7. Nichols, B. H., and Shiflett, E. L.: Ununited Anomalous Epiphyses of the Inferior Articular Processes of the Lumbar Vertebrae, J. Bone & Joint Surg. **15**: 591-600 (July) 1933.
8. Fulton, W. S., and Kalbfleisch, W. K.: Accessory Processes of Lumbar Vertebrae, Arch. Surg. **29**: 42-48 (July) 1934.
9. Mitchell, C. L.: Isolated Fractures of Articular Processes of Lumbar Vertebrae, J. Bone & Joint Surg. **15**: 608-614 (July) 1933.
10. Koch, K.: Die isolierten Gelenkfortsatzbrüche an der Lendenwirbelsäule, Deutsche Ztschr. f. Chir. **180**: 339-355, 1923.

the right inferior articular process of the fourth lumbar vertebra and the adjacent superior articular process of the fifth lumbar vertebra were fractured.

Dohan [11] in 1910 recorded a case in which the right superior articular process of the sacrum was fractured and Graessner [12] in 1912 mentioned three similar cases as having been found in a series of various types of

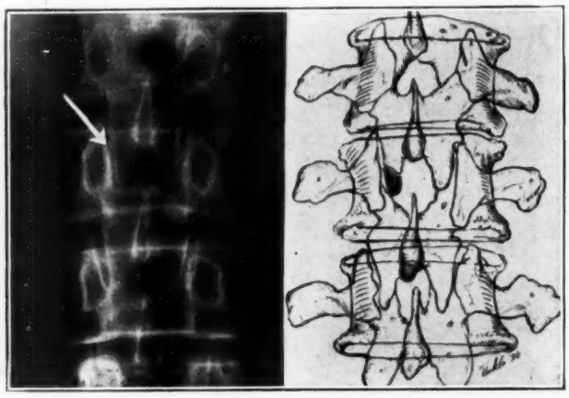

Fig. 7 (case 5).—W. H., aged 77, a physician, with no history of trauma, complained of enlargement of prostate. Oblique anomalous fissure in the right inferior articular process of first lumbar vertebra.

spinal injuries. There are several other similar reports in the old German literature. Lippens and Dejardin [13] in 1932 recorded three cases in which the articular processes of the fifth lumbar vertebra were believed to be fractured. It was not until 1933, however, that a clear-cut case was demonstrated by Mitchell [9] in a report to which reference has already been made.

In view of the frequency with which an apparent fissure formation may be simulated, especially in the lumbosacral region, when two articular processes overlap because the lateral articulations are in an oblique plane, it becomes apparent that some of the reports of fractures, especially before the present advances in radiologic technic, may not be well founded. It seems also true, however, that articular process fractures may

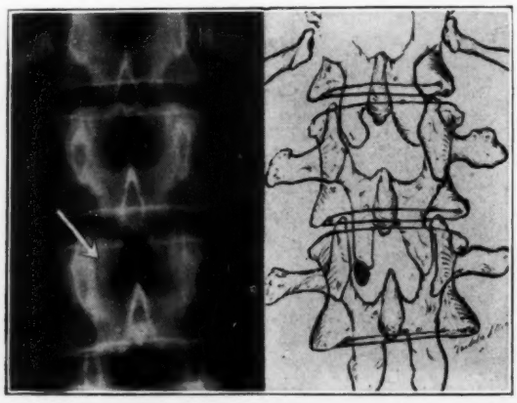

Fig. 8 (case 6).—Miss M. K., aged 26, a secretary, with no history of trauma, complained of indigestion. Anomalous oblique fissure formation in the right inferior articular process of first lumbar vertebra. Note notching in the homologous process of the twelfth thoracic vertebra.

sometimes be overlooked because the plane of the fracture is not seen in the usual routine view. The importance of radiographic exposures in the oblique as well as in the lateral position cannot be overemphasized as a means of thoroughly examining the lateral articulations and articular processes.

Both the case reported by Burk [14] and the one reported by Koch demonstrate the importance of the history, the mechanism of the trauma and the severity of the after-effects in cases of true fracture. Burk's 30 year old patient, in an effort to put heavily loaded platters on a low cabinet shelf near the floor, was squatting with her spine flexed forward when a sudden and severe twist of the spine toward the right was occasioned by her efforts. She promptly felt a sharp pain in the lower part of the back and could no longer stand completely erect. A year and half later she was still unable to bend over or lift heavy objects. An x-ray examination showed an exactly sagittal fracture fissure, which separated off a small fracture fragment through the right inferior articular process of the fifth lumbar vertebra. (The plane of the lumbosacral articulation in this case was so oblique as to be almost frontal). Operation showed the lateral lumbosacral joint space to be obliterated and motion to be occurring at a pseudo-arthrosis between the fracture fragments. Although there had been much attempt at callus forma-

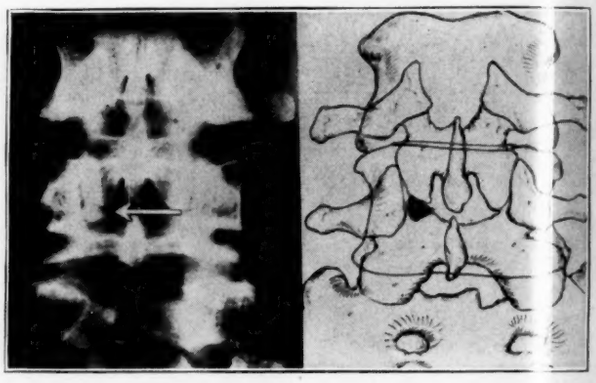

Fig. 9 (case 7).—J. B., aged 21, a laborer, strained his back six months prior to examination by falling over a box. Injured same place again by overreaching. Incomplete anomalous fissure at tip of right inferior articular process. Note also anomalous failure of fusion of the spine of the fifth sacral segment.

tion, no actual union had occurred. Two months after operative removal of the fracture fragment the patient was entirely well.

Koch's patient was flexed forward helping other men lift an anchor when another laborer shoved him sideways. A terrific pain immediately developed in his back and the patient became unconscious for a short time as a result. This is another instance of a patient who was seriously crippled until the fracture fragments (tip of the inferior articular process of the right fourth lumbar and adjacent superior articular process of the right fifth lumbar) were removed.

Both these cases show clearly that mere flexion and extension of the spine never cause such fractures, but such motion, if there is also a sideways twist, especially if a component of rotation is added, will be sufficient to cause trouble if the amount of motion is more than physiologic. Under such conditions the ligamentary pull plus the abnormal leverage of the articular processes against one another are the factors that may be sufficient to cause fractures. The factor of ligamentary pull is important in diagnosis, for the fragment is often by this mechanism pulled away from its point of attachment and does not lie in close apposition to

11. Dohan, N.: Roentgenbefunde bei Lumbago traumatica, Wien. med. Wchnschr. **60**: 976-982, 1910.
12. Graessner: Der roentgenologische Nachweis von Verletzungen der Wirbelsäule, Med. Klin. **8**: 1699-1702, 1912.
13. Lippens, A., and Dejardin, L.: La fracture des apophyses articulaires vertébrales, Bruxelles-méd. **12**: 732-734 (May 1) 1932.
14. Burk, W.: Ueber einen Bruch des Gelenkfortsatzes des V Lendenwirbels, Beitr. z. klin. Chir. **58**: 558-569, 1908.

the articular process as do the anomalous ossicles. It is also to be noted in these cases that pain is prompt and severe, and impairment of function is lasting. It seems logical to believe that the occurrence of bony union will be dependent on blood supply as well as on treatment. If the fracture occurs near the tip of the process, the chances of union, as in the cases described, are not good. If the fracture is near the base, however, union will occur. This has been the experience in the cases I have seen in which more severe concomitant spine injuries were also present.

### COMMENT ON CASES

Because of their similarity to cases 1 and 4 respectively, the roentgenograms in cases 9 and 10 are not shown. Their details were as follows:

CASE 9.—J. K., a man, aged 28, a laborer, complained of pain since straining his back while lifting. Anomalous fissures, bilateral, through the inferior articular processes of the third lumbar vertebra were found.

CASE 10.—A. B., a man, aged 35, a laborer, with no history of trauma, complained of indigestion. An anomalous fissure at the tip of the right inferior articular process of the third lumbar vertebra was found.

It is particularly instructive to note that in six of the ten cases which are presented the discovery of the articular process anomaly was incidental to an examination for some other purpose, and no history of significant trauma to the spine was elicited. If the anomaly cases with a history of trauma are compared with those giving no such history, no essential differences will be found.

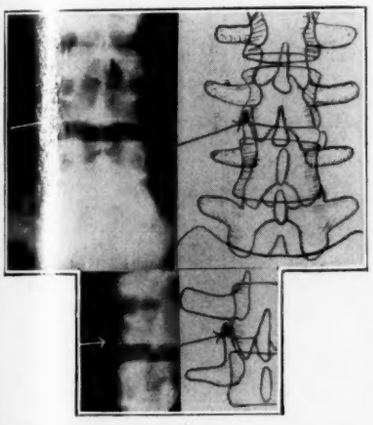

Fig. 10 (case 8).—Mrs. J. C., aged 35, a housewife, with no history of trauma, complained of vague abdominal pain. Anomalous fissure formation through the right superior articular process of the fourth lumbar vertebra. Inset: Same; spine slightly rotated.

The most usual locations of these anomalies are at the tips of the inferior articular processes of the second and third lumbar vertebrae, but in my experience all lumbar vertebrae have been involved. The fissures across the inferior articular processes of the fifth lumbar vertebra, however, were oblique and the impression from these cases was that the fissure appearance was due to an articular shelf in the transverse plane of the body, much as in the case of the cervical vertebrae, and that the tip or the articular process was not actually severed from its base. It seems entirely logical that anomalous ossicles should occur in the dorsal region; I have heard of one such case but none appear in the literature.

Although most of these anomalies appear in males, a few females are so affected. In the cases in which partial fusion has occurred, the fusion is always on the lateral side and the gap left on the mesial side has a smooth wedge shape which in no way suggests a fracture line. In some cases the only remaining evidence of these anomalous centers of ossification is to be found in the presence of a sharply defined notch in the mesial side of an inferior articular process.

In case 11, the history of a severe twisting injury to the spine due to a wagon wheel having passed over the patient's back, as well as the finely serrated edges of the straight fissure which extends almost but not quite to the lateral edge of the inferior articular process, suggested the presence of the fracture. This belief was further substantiated when in the oblique view the fissure was seen to fork at its lateral end and thus to produce a tiny wedge-shaped fragment (fig. 12).

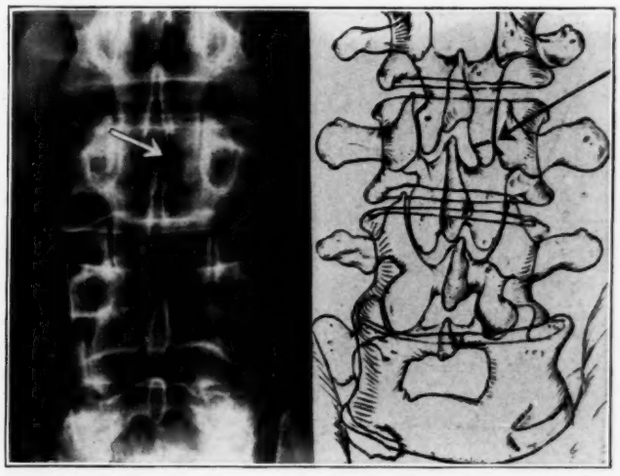

Fig. 11 (case 11).—J. A., aged 25, a laborer, gave a history of trauma capable of causing fracture. He complained of persistent pain after a wagon wheel ran over the middle of the back. There is a dark, straight fissure which extends almost to the lateral edge of the left inferior articular process of the second lumbar vertebra. The edges of this dark line show a fine serration which is not seen in the anomaly cases.

### INCIDENCE

There are nineteen cases of these articular process anomalies reported in the literature, six of which are bilateral. Ten more cases are added in this study, two of which are bilateral. Most of the patients described in the literature are males; in most of them there has been a history of trauma, and all are in the inferior articular processes of the lumbar region. The exceptions to the last statement are a case reported by

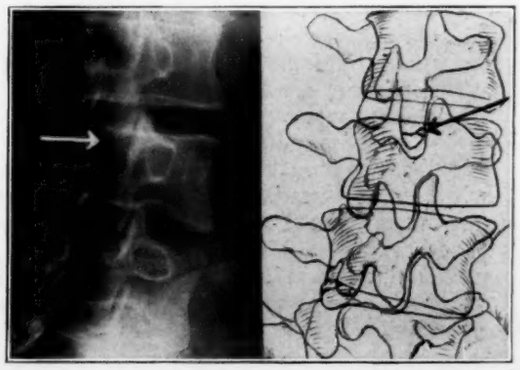

Fig. 12 (case 11).—Left oblique view. The same inferior articular process is seen to have a dark line running across it. The line once again shows irregular edges and at the lateral aspect it forks so that a definite tiny triangular fragment is formed.

Litten,[15] in which a fissure was found across the right superior articular process of the third lumbar vertebra in a patient with a history of trauma after heavy lifting, and case 8 of this series, in which there was an anomalous fissure through the right superior articular process of the fourth lumbar vertebra with no antecedent history of trauma.

15. Litten, F.: Ueber Spaltbildungen an den Gelenkfortsatzen der Wirbelsäule, Röntgenpraxis **4**: 1039-1043 (Dec.) 1922.

Since eight of the present series of ten anomaly cases were selected from 2,000 cases in which a radiographic examination of the spine was conducted, it seems likely that such anomalies are more common than would appear from the literature. As previously noted, isolated fractures of the articular processes are quite rare.

### CONCLUSIONS

1. The chief importance of fissures across the vertebral articular processes lies in the differentiation of anomalous centers of ossification at the tips of the articular processes from isolated fractures of the articular processes.

2. Such accessory ossicle formation is not very unusual. The history of antecedent trauma may be vague or entirely absent, as it was in over half the cases in this series; the defect is often bilateral, and the inferior, and very rarely the superior, articular processes are affected.

3. Fracture of the articular processes without severe concomitant injuries of the spine is a rare lesion. The mechanism is understood and the history should conform to it; the pain is prompt, severe and disabling; the fragments are usually displaced, owing to ligamentary pull; the fracture fissures are characteristically irregular and a small comminuted fragment may be produced.

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# ANOMALOUS BONES OF THE WRIST AND FOOT IN RELATION TO INJURY

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Compensation for industrial injury has become one of the major problems of our social organization, and the treatment of injuries under various forms of industrial insurance is probably the largest single field in the practice of medicine. Among the injuries sustained by workmen, those which involve the hands make up the largest group, and those involving the foot are a close second; the two combined probably comprise 50 per cent of the aggregate of industrial accidents. The manual laborer or machine operator whose hand is crippled is disabled until his injuries have healed and function has been restored. Injuries to the feet which interfere with weight bearing and locomotion are nearly as serious.

The evaluation of an industrial injury is largely influenced, perhaps too much so, by the presence or absence of bone lesions. Consequently, a knowledge of the anatomic variations in the bones and joints becomes a very essential part of the training of a physician for industrial practice. There are many bony anomalies in the body, but my aim in this paper is to confine its discussion to the principal extra bones that are found in the wrist and foot and that cause confusion in interpreting roentgenograms and evaluating injuries to those important joints.

### WRIST

Dwight lists twelve anomalies represented by distinct supernumerary bone formations in and about the wrist, any one of which can be mistaken for fracture. Several of these are rare and have not been seen in my experience.

1. Probably the most troublesome anomaly in the wrist, so far as the industrial surgeon is concerned, is the divided scaphoid (navicular) bone. Like the other carpals, this bone usually ossifies from a single center but may develop from two centers, and these may fail to fuse. In a considerable number of wrists, evidence of incomplete fusion may be observed on films (fig. 1) and occasionally the bone will be found divided into two fragments, usually of unequal size. Dwight cites a case, diagnosed as fracture, in which a careful histologic examination was made and two distinct bones with a cartilaginous plate between were shown to exist. Closely akin to this, but less frequently seen, is the divided semilunar (lunate). These two bones in their articulation with the os magnum (capitate) form the keystone of the wrist joint. The clinical importance of a divided scaphoid (or semilunar) is that the condition represents a mechanically faulty construction. Dislocation forward on the os magnum occurs more readily, a situation hardly compensated for by the fact that reduction can be more easily accomplished than is otherwise the case. The line of division in a subdivided scaphoid or semilunar is not a true joint, and trauma is usually followed by bone reaction along this line of junction. Such a reaction is difficult to distinguish from that which occurs in traumatic fracture with an abortive attempt at union. When a person with such anomalous conditions in the wrist attains full growth and enters an occupation that subjects the joint to strenuous use and repeated trauma, the first x-ray examination thereafter is very likely to reveal a dense and devitalized bone—the typical Preiser or Kienböck lesion. It is quite obvious that the management of a case of congenitally divided scaphoid, or one that has been divided by some old injury, should be quite different from a case of recent fracture. Therefore the proper interpretation of the conditions shown by x-ray becomes of paramount importance.

2. The industrial surgeon and the roentgenologist meet a somewhat similar situation in the interpretation of the os triangulare or ununited styloid process of the ulna. The existence of an additional bone distinct from the styloid process (fig. 2) is said to be rare, but it seems purely academic whether the detached fragment is an extra bone or an ununited styloid epiphysis. I am quite certain that I have seen instances of both types of anomaly, and the condition occurs often enough to be a matter of importance to industrial surgeons in determining whether the separate fragment found by x-ray examination following an injury to the wrist is a true anomalous bone, an old fracture with nonunion, or a recent fracture. When found associated with Colles' fracture, it is not of major importance because it will be repaired by bony or fibrous union by the time the fracture of the radius unites. It is when the separate styloid is the only suggestive finding that it becomes important. Correct interpretation requires a high degree of technical skill in producing suitable films and critical judgment by the roentgenologist in drawing conclusions. I have seen many wrists in which I am quite certain that the separate fragment has never been united, others in which fracture was definite and still others in which a single examination was not conclusive.

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From the Pathological Laboratory.
Read before the Section on Radiology at the Eighty-Seventh Annual Session of the American Medical Association, Kansas City, Mo., May 14, 1936.

3. A secondary pisiform bone may exist, seen more distal in the carpus than the os triangulare.

4. Still more rare is the ulnare externum, a separate fragment associated with the cuneiform (triquetral) bone.

5. The os centrale more often persists as cartilage, even in the fully developed wrist (fig. 1). In such cases it is seen as an area of absent density in the radial side of the os magnum. When ossified, it may be joined to the scaphoid or more rarely may exist as a separate ossicle (fig. 3).

6. The radiale externum is a separate bone fragment found just distal to the styloid process of the radius. It is not associated with the radius but is an unfused tubercle of the scaphoid (navicular) bone.

7. The epilunatum is the dorsal tip of the semilunar (lunate) bone, which occasionally exists as a separate fragment.

FOOT

In the foot and ankle region there are twelve anomalous bones which need to be recognized.

1. *The Os Trigonum.*—The posterior projecting portion of the astragalus (talus) is grooved for the tendon of the flexor hallucis longus. External to this groove is a prominent tubercle, the posterior process, to which the talofibular ligament is attached. This process varies greatly in size and shape; it is often observed developing as a separate epiphysis in the growing individual, and various degrees of fusion are found in the adult. In about 10 per cent of cases this process or tubercle is found as a separate or incompletely fused bone (fig. 4). There seems to be some disagreement among anatomists as to whether such a separate bone, when present, is an unfused posterior process or a distinct bone lateral to the posterior process. Pfitzner, probably the greatest authority on skeletal variations, contends

Fig. 1.—Divided scaphoid (navicular). The division apparently is not complete, the two fragments being united by a thin bridge of bone. There is no history of injury. A cartilaginous os centrale is also shown, represented by the notch in the radial side of the os magnum (capitate).

Fig. 2.—A distinct separate bone distal to the styloid process of the ulna. This is more likely a small sesamoid than an ununited styloid tip.

Fig. 3.—An os centrale associated with the scaphoid bone, but showing as a distinct ossicle.

8. The pretrapezium is the distal end of the ridge of the trapezium (multangular majus), which may occasionally exist as a separate fragment.

9. The subcapitatum is the distal end of the os magnum (capitate) on the palmar surface, which has been found as a separate fragment.

10. The secondary trapezoid is a free bone found in almost the same position as the pretrapezium but arising from the base of the second metacarpal bone.

11. The styloid process of the second metacarpal bone may develop independently and remain free or become fused with the trapezoid (multangular minus) or os magnum (capitate).

12. The os vesalianum manus is a free bone situated at the base of the fifth metacarpal. The tubercle for the attachment of the extensor carpi ulnaris varies considerably in size, and a fragment of it may exist as a separate ossicle. I have never encountered this anomaly, but I can easily see how it would offer difficulties and that it would probably be diagnosed as a sprain-fracture involving the attachment of the muscle mentioned.

that it is a distinct bone. When such a detached fragment is shown in a roentgenogram of the foot, taken after an injury, the question of its status immediately becomes important. Decision must be made as to whether it is an anatomic variation and of no clinical importance or whether it is a fractured posterior process probably associated with rupture of the talofibular ligament. Sometimes the x-ray evidence is clear cut that it is either a congenital nonunion or a fragment detached at a time so remote that definite structural changes have developed. Usually the question of traumatic detachment must be answered by the x-ray evidence and observation, by a series of films suitably spaced.

2. *The Tibiale Externum.*—Two structures are called by this name. One is a sesamoid in the tendon of the tibialis posticus; the other is the unfused tuberosity of the scaphoid (navicular) bone (fig. 5). Both of these are seen frequently. The sesamoid bone is usually separated sufficiently from the scaphoid so that the question of fracture is not raised. However, the ununited epiphyseal tuberosity, or true tibiale externum, is often quite confusing. Since the tendon of the

tibialis posticus muscle is inserted into this tuberosity and is one of the chief muscles of plantar flexion, a forcible dorsiflexion might, and no doubt often does, rupture this attachment and along with the tendon injury may detach a fragment of bone. The surgeon and roentgenologist frequently have the responsibility of differentiating between an actual fracture and an unfused tuberosity. Roentgenograms of the opposite side do not help much, as Pfitzner is said to have found the anomaly unilateral in more than one third of his observations. Examples of the sesamoid type, as well as various sizes, shapes and degrees of union of the tuberosity, are frequently seen; sometimes it is subdivided. It is readily understood how an x-ray examination taken two or three weeks after a foot injury, such as dropping a weight on top of the foot, may show such a detached bone fragment, which can easily be interpreted as a fracture, and it is usually the responsibility of the roentgenologist to say positively that such a condition is or is not a fracture.

3. *The Os Peroneum.*—This is the most commonly observed extra bone in the foot, and probably the least important. It is a sesamoid bone in the tendon of the peroneus longus where that muscle grooves the cuboid bone. Its position varies considerably, sometimes well forward under the cuboid, at other times more posterior beneath the head of the os calcis (calcaneum) or in an intermediate position under the calcaneocuboid articulation; it also varies much in size, shape and density and may be subdivided. Though of less clinical importance than some other anomalous bones, cases have been encountered in which dispute and confusion have arisen over this bony fragment.

4. *The Os Vesalianum Pedis.*—This bone corresponds to the bone of the same name in the hand, being the unfused tuberosity at the base of the fifth metatarsal bone. It is said to be rare; I have not observed

Fig. 4.—Congenital nonunion of the posterior process of the talus (astragalus), forming the os trigonum.

it in an adult foot. In the developing foot it is constant as a separate epiphysis, fusing about the twentieth year. An injury to the foot of a person at this age will sometimes raise the question as to whether a detached fragment is an epiphysis not yet united or a tuberosity that has been fractured by the trauma.

5. *The Secondary Os Calcis.*—The variations in size and contour of the anterior process of the os calcis (calcaneum) are great. Often the interosseous space between this process and the scaphoid and cuboid is quite wide and filled with cartilage. By calcification in this interosseous cartilage a secondary os calcis may arise. Such an extra bone may fuse with the projecting angle of the os calcis proper or with the scaphoid, or it may remain as a distinct extra bone (fig. 6). In two instances I have made the error of diagnosing such an anomaly as a fracture only to conclude after observing treatment over a period of weeks that the condition was not a fracture but an anomalous bone. The appearance of a freshly fractured process is usually distinctive (fig. 7).

Fig. 5.—Tibiale externum, represented by nonfusion of the tuberosity of the tarsal scaphoid.

6. *The Intermetatarseum.*—This is an extra bone located between the internal cuneiform and the first two metatarsal bones. It is said by Dwight to be present in 10 per cent of people, but I have seen only one definite example and erroneously diagnosed that as fracture, changing the interpretation when I learned that there was no tenderness, pain or disability in that part of the foot.

7. *The Secondary Cuboid.*—This may occur as a separate fragment but is usually fused with the scaphoid at the lower and outer edge of that bone.

8. *The Subdivided Internal Cuneiform.*—This is mentioned by Dwight as a rare occurrence; I have never observed it.

9. *The Intercuneiform.*—This, another rare anomaly, is a wedge-shaped bone on the dorsum of the foot in front of the scaphoid.

10. *A Divided Sesamoid of the Great Toe.*—This anomaly is fairly frequent. When found in a patient who has dropped a heavy weight on the toe, it is difficult to convince surgeon, patient or oneself that it is an anomaly and not a fracture.

11. *A Separate Styloid Tip of the Fibula.*—This anomaly corresponds to that found in connection with the ulna and is occasionally observed. When found in connection with a sprained ankle, it requires good judgment on the part of the radiologist and considerable confidence in that judgment on the part of the surgeon to decide that the detached fragment was not produced by the sprain. Sometimes the evidence is clear; at other times it is not.

12. *A Separate Styloid Tip of the Internal Malleolus.*—A similar detached fragment is occasionally found beyond the tip of the internal malleolus, offering the same difficulties and opportunities for the exercise of good judgment.

## CONCLUSION

This brief summary aims to emphasize the necessity for the closest cooperation between surgeon and roent-

genologist in studying and treating injuries to the joints of the extremities. Only the most scrupulous care in making and interpreting roentgenograms, coupled with good critical judgment by the surgeon, both based on exact anatomic and physiologic knowledge, will prevent injustice to the patient and costly errors in diagnosis.

507 Professional Building.

## ABSTRACT OF DISCUSSION

### ON PAPERS OF DRS. BAILEY AND WATKINS

DR. ARTHUR STEINDLER, Iowa City: Accessory centers of the vertebrae are known to be present regularly at the tips of the transverse and the spinous processes. Less is known of the secondary centers of ossification over the tips of the articular processes. It was a good point to bring in the so-called absorption zones of Loeser because of the fact that these absorptive zones are observed and considered of importance in those cases of separation which occur between the upper and lower articular processes, that is, in the so-called isthmus, where they are supposed to be responsible for spondylolysis and the development of a separate neural arch. I have observed four cases of fracture of the articular processes of the lumbar spine. The fractures were caused three times by direct violence and once by indirect violence. In two cases the lower articular process was fractured and in two cases the upper articular of the fifth lumbar was fractured. They were all associated with back injuries, especially sacro-iliac injuries. The roentgenogram showed what was considered to be healed fractures of the lower articular processes of the lumbar spine. All these articular processes demonstrated here were directed in the sagittal plane. The greatest encroachment in the mobility of the lumbar spine, with the exception of the sacral lumbar juncture, is the rotation. I believe that when the force strikes the vertebrae it is not so much the lateral deviation as the rotation by which a locking of the articular processes occurs and brings about the fractures seen in the demonstration of Dr. Bailey. I have occasionally seen divided scaphoids. One has to decide from the smoothness of the joint surface and the density of the two portions of the bone that the condition is an anomaly and not a fracture. Cystic degeneration often accompanies fractures and is significant of traumatic origin. Congenital synosteoses occur between the carpal or tarsal bones.

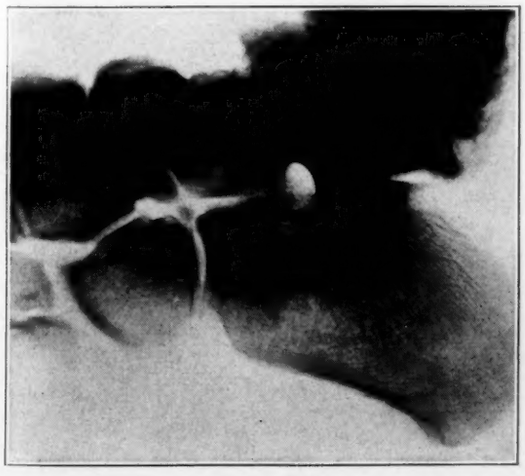

Fig. 6.—The secondary os calcis, due either to nonfusion of the anterior process of the os calcis or to calcification in the interosseous cartilage. This was diagnosed as a fracture at first.

I have observed a woman with fusion of the first three and the last two metacarpals, and exostosis between the metatarsals and six toes, who had a congenital synosteosis between the hamate and the capitate. As to the etiology, one can only speculate. With regard to synosteosis of the tarsus, however, one is probably getting a better idea of how the condition comes about. The condition has been known since 1880. Slomann has made quite a study of the calcaneoscaphoid synosteosis, which I have observed in two cases. It is probably due to the ossification of the os calcis with the os calcis secondarium, which, according to Pfitzner, occurs in 1 per cent of the cases. Six such cases were reported by Bentzon. I have observed two.

DR. FREMONT A. CHANDLER, Chicago: The ossification of the posterior element of the spine progresses from a center at the base of the transverse process posteriorly. One therefore must look for the interruption of the ossification rather than the formation of an extra center to account for the lesions

Fig. 7.—True fracture of the anterior process of the os calcis.

demonstrated by Dr. Bailey. Similar defects of ossification may be seen in the total absence of the articular process or the great variety of anomalous shapes which this process may have. The clinical recognition of such a lesion is undoubtedly of the greatest importance, and it is significant that the illustrations shown by Dr. Bailey were taken from patients presenting no local complaints. Whether or not an injury produces such a transverse lesion or whether it aggravates it introduces a most important question regarding the compensability of such a lesion. In most states, aggravation of a preexisting condition is recognized, and I believe that in these lower articular process lesions this state of affairs exists. Occasionally loose ossicles may be encountered during the course of a spine fusion operation. The most significant point of differentiating a congenital defect from a fracture at this site would be the alteration of the bone substance over a period of time, as reflected in the x-ray films. If due to fracture, progressive absorption and eventual recalcification would probably occur. In one or two of the illustrations shown by Dr. Bailey there was evidence of spur formation at the margins of the vertebral body. To me the occurrence of such spurs would indicate that trauma, acute or chronic, may have some direct relationship to the separate center of ossification. Dr. Watkins has given a thorough review of the major works dealing with the bony anomalies of the hand and foot. An orthopedic surgeon is interested in these anomalies as a means of differentiating fractures as well as explaining local symptoms. In the foot, the os tibiale externum is probably the most important. It is seen frequently in pronated feet and presents the clinical and pathologic picture similar to that found in Osgood-Schlatter's disease. Next in importance is the bipartite sesamoid, usually found in relationship to the head of the first metatarsal. These may be bilateral and have no clinical significance. They do, however, give a poor weight-bearing surface, which is susceptible to direct or indirect strain. Excision of such a divided sesamoid must be done with the greatest caution so as not to disturb the action of the short flexor tendon of the first toe. Third in importance is the separate center of ossification at the proximal end of the fifth metatarsal bone. This may be confused with fracture.

DR. LEO G. RIGLER, Minneapolis: I want to comment on the paper of Dr. Watkins and report two pieces of unpublished work that might be of interest. One of my assistants, Dr. John Eneboe, and I, some years ago studied several hundred children

with regard to establishing the constancy or inconstancy of the epiphysis of the tuberosity of the fifth metatarsal. As Dr. Watkins showed, there is an area of density below the fifth metatarsal, near the tuberosity; in the study of these children we found that that epiphysis, in all probability—it is difficult to establish positively unless one follows children over a long period—is fairly constant. It is present, however, for such a short time during the life of the individual that the impression is gained that it is inconstant. A child of 11 may show the epiphysis; by the age of 12 frequently it has fused to the bone and cannot be seen. What I wanted to emphasize particularly was that a fracture occurring in that fashion certainly must be very rare. When fracture of the tuberosity of the fifth metatarsal occurs, it goes across in transverse fashion, and the disk-like shadow of the epiphysis should never be mistaken for it. My impression of the os vesalianum is that it is a very different structure; it is a little density proximal to rather than on the inferior outer surface of the tuberosity of the fifth metatarsal, and it is an extremely rare extra ossicle. Some years ago I studied a series of twins and triplets, and there was one set of identical triplets in all three of which the small ossicle of the internal malleolus of the tibia which Dr. Watkins demonstrated was present. Certain other anatomic variations occurred in some identical twins. Some of these variations are so unusual that it is reasonable to assume, in view of their presence in all three, that they are preformed, entirely genetic, and not due to changes in utero or later acquisition.

DR. WILBUR BAILEY, Los Angeles: Dr. Chandler brings up a significant point when he says that these anomalies may be points of lessened resistance and that after a trauma the question always arises whether the anomalous fissure may not have been a weakened point. We really do not have enough information as yet on this subject to be certain. There were six cases in which there was no history of immediate trauma, which if considered with the remaining four cases in which there was a definite history of trauma show no characteristics sufficiently marked to enable one to separate the traumatic from the nontraumatic cases.

DR. W. WARNER WATKINS, Phoenix, Ariz.: The title of my paper as published here, is misleading, as it says "bony anomalies." I confined myself to anomalous bones rather than to other anomalies and so did not try to include synosteoses in the hand and wrist. I wanted to deal with those injuries that are mistaken for fractures. The paper came out of my experience with the Industrial Commission work. A plan has been adopted in Arizona which is rather unique; the referee of the Industrial Commission has been asking that all x-ray films made by practitioners all over the state, except the large corporations carrying their own insurance, shall be sent to his office. I have been called on for interpretations on doubtful injuries. Practically every anomaly shown here today came out of that experience and had been diagnosed fracture by some practitioner, not by a radiologist. In isolated districts the doctors have made their examinations and have done the best they could, but they made some very serious mistakes as far as the Industrial Commission was concerned. I am glad to know Dr. Rigler's explanation of the os vesalianum. I have never seen one and I am glad to know where it ought to be. I hoped to find it in making a review of all the hands and feet in my file but did not. I should like to express my appreciation of Dr. Bailey's paper, because in this work we have a medical rating board, of which I am consulting radiologist, and before this board the Industrial Commission every month brings its difficult cases. Out of 126 cases that we have had during the past year, seventy were supposed back injuries. In most of them I could not find the back injury. I shall review all the cases and see whether this particular lesion, which I confess I have not yet looked for, is present.

**No Syphilis in Gilbert Islands.**—Syphilis continues to be nonexistent, and only a few cases of gonorrhea are seen from time to time. The incidence of visible yaws in the Gilbert Islands is said to have declined markedly, secondary manifestations now being rarely met with; 10,073 anti-yaws injections were given at the various hospitals during the year.—*Trop. Dis. Bull.* **33**:214 (Oct.) 1936.

# CONGENITAL LUNG CYST

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AND
L. C. HARRIS JR., M.D.
MEMPHIS, TENN.

Congenital cyst of the lung may be defined as an intrapulmonary fluid sac of which the wall is composed of bronchial tissue and the fluid content is a product of the bronchial epithelium. Its formation is attributed to an anomalous occlusion of the bronchus in the embryo.

This condition, formerly seldom encountered, is now being recognized with increasing frequency with present day improved methods of roentgenologic technic. The literature is sufficiently complete to enable the well informed to make a diagnosis of cystic disease when the proper procedure of examination is followed. We believe that a larger number of cases would be discovered if routine roentgenograms of the chest were made on atypical pulmonary infections at the end as well as at the beginning of the disease. This statement is well supported by the cases cited by Kostlin,[1] Barlow,[2] Coats,[3] Frühwald,[4] Debré and Blinder[5] and many others. Further, after the early cases reported by Bartholinus[6] in 1687 and Meyer[7] in 1859, Koontz[8] was able to collect only 108 from the world's literature to 1925, all of which were observed at autopsy, whereas 152 cases have been described in the past decade. We believe, therefore, that this pathologic entity should receive more thoughtful regard in the differential study of chest diseases.

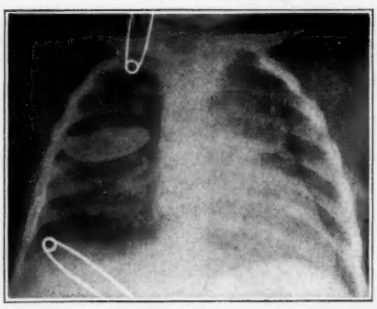

Fig. 1 (case 1).—Roentgen appearance of chest, November 7, demonstrating fluid cyst as opacity in midportion of the right lung field.

The number of cases of cyst of the lung found at autopsy gives an inaccurate conception of its true incidence. The growth may be masked by secondary complications, such as abscess or rupture, and may be overlooked by the pathologist unless the bronchi are carefully searched for the site of obstruction. Also, those cases not diagnosed clinically which undergo spontaneous recovery never come to necropsy.

## REPORT OF CASES

The following case of expansile air cyst is the second recognized by one of us (King):

CASE 1.—D. S., a Negro girl, aged 8 months, was the only child of healthy parents. She was born after a normal labor and weighed 6 pounds (2,720 Gm.) at birth. Her infant cry and primary respirations had been spontaneous. There was nothing unusual in the child's progress until a few days before Nov. 5, 1935, when she was brought to the Memphis General Hospital. At that time a nasal discharge and a cough which

Read before the Section on Radiology at the Eighty-Seventh Annual Session of the American Medical Association, Kansas City, Mo., May 15, 1936.

1. Kostlin: Arch. f. phys. Heilk., 1849.
2. Barlow, T.: Brit. M. J. **1**: 14, 1880.
3. Coats, quoted by Koontz.[8]
4. Frühwald, F.: Jahrb. f. Kinderh. **23**: 418, 1885.
5. Debré, R., and Blinder, H.: Bull. et mém. Soc. méd. d. hôp. de Paris **48**: 818 (June 6) 1932.
6. Bartholinus, T.: Malpighii Opera Omnia, Leyden ed., p. 349.
7. Meyer, H.: Virchows Arch. f. path. Anat. **16**: 78, 1859.
8. Koontz, A. R.: Bull. Johns Hopkins Hosp. **37**: 340 (Nov.) 1925.

produced mucoid material had developed, and she began tugging at her ears. Two days prior to admission she had become dyspneic and febrile.

On physical examination she was well developed and well nourished. Her temperature was 103 F., and respirations were 46 per minute. She had an occasional cough, a mucoid nasal discharge, pharyngeal hyperemia and a catarrhal injection of both tympani. Scattered râles were heard throughout both lungs.

Laboratory studies revealed white blood cells 28,000, red blood cells 4,300,000, hemoglobin 13.2 Gm. per hundred cubic centimeters, polymorphonuclear neutrophils 71 per cent, polymorphonuclear eosinophils 2 per cent, lymphocytes 21 per cent, myelocytes 4 per cent, and large mononuclears 2 per cent. The results of urine analysis and other laboratory tests were insignificant.

Examination of the patient's chest two days after admission elicited signs of consolidation in the midportion on the right. The temperature was now further elevated and showed a septic curve. Bilateral myringotomy induced the drainage of frank pus. Roentgenograms of the chest at this time demonstrated a well circumscribed curvilinear area of opacity measuring 1 by 1½ inches in the upper part of the lower lobe of the right lung (fig. 1). Following myringotomy and routine treatment, the child improved to some extent. The clinical course, however, continued to indicate a septic condition, and on November 23, eighteen days after entering the hospital, she became lethargic, her respiratory rate increased, and her cough ceased to be productive. November 27 it was noted that evidences of consolidation had disappeared over the right side of the chest and breathing on both sides had become wheezy. Two days later a bilateral mastoidectomy was performed. The temperature rose to 106 F., coincident with the appearance of the signs of meningismus. The râles were more diffuse and the percussion note over the lower right side of the chest was hyperresonant. For the first time cyanosis was apparent. Although these symptoms were fairly continuous, there were exaggerated periods in which death seemed inevitable. The child vomited frequently, refused food and showed evidences of early dehydration.

It was not until December 7 that a second roentgenogram disclosed a multilocular air sac replacing not only the area of cloudiness seen at the previous examination but also the lung tissue of the middle and lower lobes of the right side of the chest. The diaphragm was displaced downward and the heart to the left (fig. 2). The pressure within the cystic sac increased during inspiration. A differential roentgenologic survey resulted in a diagnosis of lung cyst.

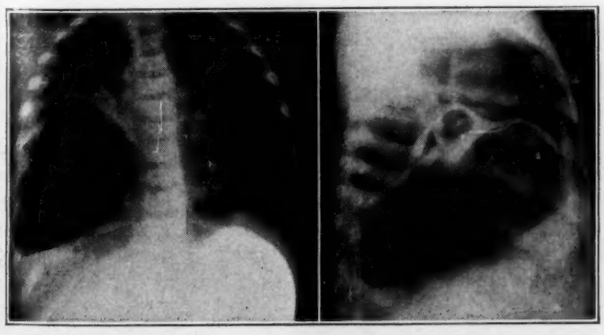

Fig. 2 (case 1).—Second examination, December 7, apparently fourteen days after bronchial communication. Anteroposterior and lateral views showing replacement of fluid cyst by large expansile air cyst.

The clinical course continued as before until December 11, about five weeks after the patient's admission, when the intensity of the paroxysm of cyanosis, dyspnea and lethargy failed to subside, and she died.

The case presented is that of a multilocular solitary cyst involving a portion of the right lung. The picture, as visualized through the history, the physical and roentgenologic observations and the clinical course, illustrates, first, a classic expansile fluid cyst colored by secondary infection, and, secondly, the usual fatal termination of congenital cystic disease following the establishment of a certain type of bronchial communication.

The child enjoyed a normal existence, carrying a lung cyst from birth with impunity, until subjected to a severe infection of the upper respiratory tract. During a seizure of vigorous coughing the fluid cyst ruptured into an adjoining bronchiole, causing the expectoration of its albuminous contents. The bronchial aperture thus formed acted as a one-way valve mechanism. After allowing the exit of the cystic fluid, air entered and the valve closed the opening, preventing its egress. With each respiratory cycle the cystic cavity was further distended. When roentgenograms were subsequently made, no retained fluid was observed; air occupied the entire cavity, which was greatly enlarged and had extremely thin walls. The air was under pressure, thus displacing the mediastinum and depressing the diaphragm on the right. The decreasing pulmonary field caused progressive dyspnea, cyanosis and eventual death. Although autopsy was refused, we feel justified in labeling the condition a congenital cyst. Similar cases have been found by Blatt and Jacobs,[9] Hünermann and Sievers,[10] Fontanus [11] and others.

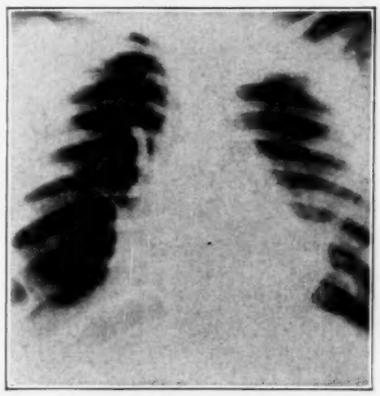

Fig. 3 (case 2).—Posterior anterior view of very large air (balloon) cyst, originating in the left apex, herniating through mediastinum, compressing the upper half of the right lung and the entire left lung.

Following is a follow-up report on a patient with congenital air cyst of the lung who has now been well for four and one-half years. The case was reported in THE JOURNAL in 1933 by Dr. Clyde Croswell and one of the authors.[12]

CASE 2.—N. D., a white boy, born without incident to normal parents, showed no signs of an abnormality until he was 5 months of age. At that time he had an acute illness which was diagnosed as bronchopneumonia, from which he recovered under the usual treatment. At 12 months of age he had a recurrence of the illness and for three consecutive months suffered a similar attack, with a similar recovery from the first two. The third, however, was complicated by otitis media, and it was also noted that the child expectorated a large quantity of yellow material on several occasions. When the fever subsided in the last paroxysm he continued to suffer from progressive dyspnea. The physical and roentgen manifestations were those of expansile air (balloon) cyst of the lung (fig. 3).

The child was kept alive for thirteen weeks by repeated thoracenteses, neutralizing the intrathoracic pressure. A spontaneous recovery was observed seven days after the injection of iodized oil into the cystic cavity (fig. 4). He has continued to be well and has developed normally. A recent examination revealed a small amount of the iodized oil in the left side of the chest but no other residual evidence of the original cyst.

It is our belief that cure resulted from occlusion of the bronchial communication and destruction of the bronchial mucosa lining the cyst and that the iodized oil and infection brought about this change.

9. Blatt, M. L., and Jacobs, H. M.: Arch. Pediat. **52**: 250 (April) 1935.
10. Hünermann, C., and Sievers, H.: Ztschr. f. Kinderh. **50**: 451, 1930.
11. Fontanus, quoted by Debré and Blinder.[5]
12. Croswell, C. V., and King, J. C.: Congenital Air Cyst of the Lung, J. A. M. A. **101**: 832 (Sept. 9) 1933.

Pearson,[13] in commenting on this case, diagnosed it as bilateral cystic disease. Apparently he failed to observe that the large cyst of the left lung herniated through the mediastinum into the right side of the chest while under intense pressure and that the entire sac returned to the left side of the chest when it collapsed.

### ETIOLOGY AND PATHOGENESIS

It is almost unanimously agreed that cystic disease is congenital in origin. Many theories have been advanced to explain the anomaly, yet this academically important issue still is unsettled. Lohlein,[14] Buchmann,[15] Couvelaire,[16] Stoerk[17] and Hückel[18] observed epithelial and connective tissue proliferations and considered the lesion neoplastic in nature. Blatt and Jacobs[9] recently described similar changes. Heuter[19] and Grawitz[20] believed it to be a congenital bronchiectasis; Francke[21] and Heller[22] regarded it as a congenital atelectasis and de Lange[23] as an atelectatic bronchiectasis with defective development of the alveolar tissue and excessive dilatation of the bronchi. Virchow[24] and Klebs[25] considered it a lymph vessel dilatation. Sandoz[26] and Oudendal[27] were of the opinion that congenital syphilis was an underlying cause. Box[28] and Bernstein[29] concluded that the process was a sequel of bronchopneumonia, possibly because of the frequently concurring pneumonitis. Parmalee and Apfelbach[30] advanced the idea that the cysts originate as small bronchiectatic cavities, which become distended with fluid during prenatal growth. Miller[31] and Wood[32] are of the opinion that there may be many unknown factors which are instrumental in the production of congenital cysts of the lung and believe that the subsequent progress has little bearing on these factors. In 1928 Mueller[33] published an excellent article giving a critical review of theories advanced prior to that time, to which the reader is referred.

Microscopic studies of the structure of a fluid cyst, as obtained from autopsy reports, reveal the following characteristics: The walls are formed of fibrous and elastic tissue and concentric muscle fibers with interspersed cartilaginous plaques. The lining of a small cyst possesses stratified ciliated columnar epithelium, which is flattened into cuboidal shape as the cyst increases in size. The albuminous fluid content is composed of mucus, cellular débris, desquamated epithelial cells and white blood cells.

In order to understand clearly the formation of a cyst in the lungs, it is necessary to analyze the lung development in the embryo. According to Simpkins,[34] the bronchi develop as small ramifications of solid entodermal tissue, which become canalized almost immediately. It is our opinion that an unknown process interferes with the canalization at some point proximal to the termination of that ramification, resulting in its occlusion and causing a portion of the radicle to persist as a mass of cells. Canalization begins again distal to the occlusion, producing an isolated canalized segment with normal mucous membrane, which assumes its natural secretory function. This secretion accumulates and, since it has no exit, forms a cyst (fig. 5). Lung cysts with wall structure characteristic of bronchial tissue have been found at autopsy performed on infants who died at birth, as reported by Wolman,[35] Pappenheimer,[36] Kessler,[37] Smith,[38] Collins[39] and others. In some of these the cysts formed prior to the development of alveolar tissue. Necropsies of those patients who lived for a time failed to reveal pigment in the cystic area, although it was present in the remaining lung tissue. These facts seem to establish the congenital bronchogenic origin of the cysts.

Probably the rapidity of prenatal growth and the size of the cyst at birth are dependent on (1) the amount of functioning bronchial mucosa entrapped and (2) the capsular strength of the cyst.

Postnatal growth usually is more rapid, being encouraged by the negative intrathoracic pressure, which

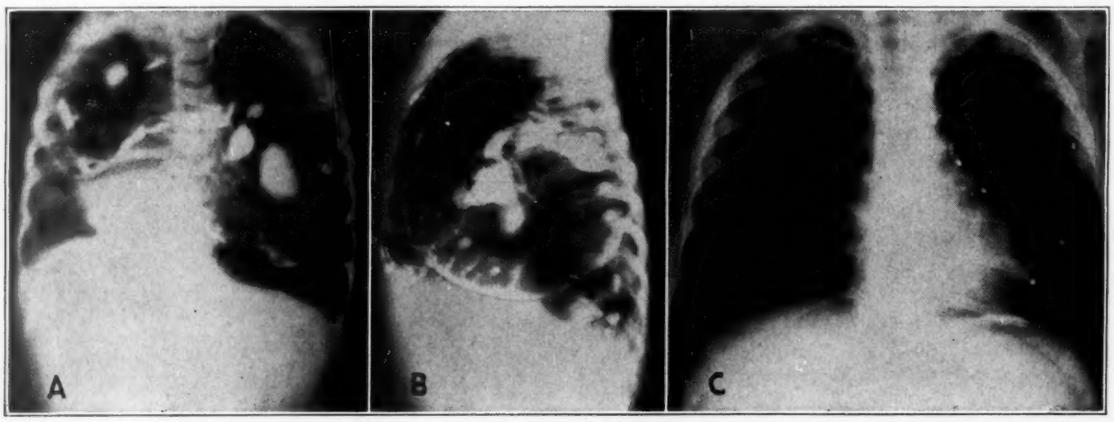


Fig. 4 (case 2).—Roentgen appearance after injection (through chest wall) of iodized oil: *A* and *B* are posterior anterior and lateral views; *C*, same case four and one-half years after complete recovery.

13. Pearson, E. F.: Am. J. Thoracic Surg. **4**: 84 (Oct.) 1934; Illinois M. J. **67**: 28 (Jan.) 1935.
14. Lohlein, M.: Verhandl. d. deutsch. path. Gesellsch. **12**: 111, 1908.
15. Buchmann, E.: Frankfurt. Ztschr. f. Path. **8**: 263, 1911.
16. Couvelaire, A.: Rev. mens. d. mal. d. l'enf. **22**: 60, 1904.
17. Stoerk, O.: Wien. klin. Wchnschr. **10**: 25, 1897.
18. Hückel, R.: Frankfurt. Ztschr. f. Path. **35**: 320, 1927.
19. Heuter, C.: Beitr. z. path. Anat. u. z. allg. Path. **59**: 520, 1914.
20. Grawitz, P.: Virchows Arch. f. path. Anat. **82**: 217, 1880.
21. Francke, W.: Deutsches Arch. f. klin. Med. **52**: 125, 1894.
22. Heller, A.: Deutsches Arch. f. klin. Med. **34**: 189, 1885.
23. de Lange, Cornelia: Nederl. Tijdschr. v. Geneesk. **1**: 2515 (June 12) 1926; ibid. **78**: 5127 (Nov. 10) 1934.
24. Virchow, Rudolf: Gesammelte Abhandlungen zur wissenschaftlichen Medezin, ed. 2, 1862, p. 982.
25. Klebs, E.: Die allgemeine Pathologie, Jena **2**: 334, 1889.
26. Sandoz, E.: Beitr. z. path. Anat. u. z. allg. Path. **41**: 495, 1907.
27. Oudendal, A. J. F.: Virchows Arch. f. path. Anat. **244**: 59, 1923.
28. Box, C. R.: Lancet **1**: 16, 1907.
29. Bernstein, J. M.: Tr. Path. Soc. London **56**: 330, 1905.
30. Parmalee, A. H., and Apfelbach, C. W.: Congenital Air Cyst of the Lung, Am. J. Dis. Child. **41**: 1380 (June) 1931.
31. Miller, R. T., Jr.: Congenital Cystic Lung, Arch. Surg. **12**: 392 (Jan., pt. 2) 1926.
32. Wood, H. G.: Proc. Staff Meet., Mayo Clin. **9**: 414 (July 11) 1934; Congenital Cystic Disease of the Lungs, J. A. M. A. **103**: 815 (Sept. 15) 1934.
33. Mueller, H.: Handb. d. spez. path. Anat. u. Histol. **3**: 550, 1929.
34. Simpkins, S. S.: Personal communication to the authors.
35. Wolman, I. J.: Bull. Ayer Clin. Lab. Pennsylvania Hosp. **2**: 49 (June) 1930
36. Pappenheimer, A. W.: Proc. New York Path. Soc. **13**: 193, 1912.
37. Kessler, B.: Inaugural Dissertations, Zurich, 1858.
38. Smith, S.: Brit. M. J. **1**: 1005 (May 30) 1925.
39. Collins, D. H.: J. Path. & Bact. **37**: 123 (July) 1933.

begins with respiration. Growth of the cyst compresses the surrounding bronchi, causing atelectasis distal to the compression and thus encouraging infection in the bacteria-laden lung tissue. The course of the cyst may be altered by these changes, or its presence may be entirely obscured. Infection likewise plays an important part in the rupture and evacuation of the cystic fluid. However, Ribadeau-Dumas and Rault,[40] Cautley,[41] Wood [32] and others report necropsies in which no inflammation was apparent.

Grossly, the subsequent behavior of a lung cyst may take one of two courses: First, it may rupture into a bronchus or, second, it may remain a fluid sac without bronchial communication. A study of these actions constitutes the most interesting and instructive phase of cystic disease, since it is from this point forward that the varied clinical pictures develop. For simplification of this study, we submit the diagram shown in figure 6.

From a survey of the literature, the termination most frequently observed is rupture into a bronchus. This establishes different degrees of bronchial obstruction, on which the clinical manifestations depend.

Chevalier Jackson [42] described the types of bronchial obstruction and correlated their mechanics and physical signs. He stated that these obstructions are represented in mechanics by (1) a stop valve, (2) a check valve and (3) a bipass valve.

The obstruction that is commonly accepted for an explanation of the expansile balloon cyst formation is Jackson's check valve type (fig. 6). This valve-like action occurs when a bronchial connection is established which permits the ingress of air without corresponding egress. The autopsy records of Nelson [43] and Jacobs [44] clearly demonstrate this mechanism, and the two cases that we describe were, at one stage, also examples.

In another type, the ruptured opening is small but sufficiently large to allow both ingress and egress of air, forming a bipass valve and resulting in a nonexpansile air cyst. Hünermann and Sievers,[10] Miller [31] and Hennel [45] have reported cases belonging to this group. A number have likewise come under our observation.

When the opening is large and free, unobstructed bronchial communication is established and the cyst is cured spontaneously. Zarfl,[46] Vollmer [47] and Schenck and Stein [48] describe cases in point. This form of termination occurs more often than one is aware of and may be a factor in the low incidence reported at necropsy.

All fluid cysts of the lung are caused by Jackson's so-called stop-valve occlusion. When the wall of the cyst is sufficiently strong to support an intracystic pressure which inhibits the secretory activity of the mucous cells of the germinative lining membrane, the fluid cyst remains as an asymptomatic parasite, as illustrated by Wood,[32] Basso [49] and Paviott.[50] This type is important from a standpoint of differential diagnosis, since usually it is discovered by accident. Kleine [51] and Mencarelli [52] have each reported a case in which an unruptured asymptomatic cyst aborted through the visceral pleura, remaining attached by a pedicle.

Infection of a cyst may occur by extension of bacteria through its walls, causing isolated abscesses. This was true of three cases cited by Sergent and his co-workers [53] and was further substantiated by the work and case reports of Zdansky,[54] Siems [55] and Pollock and Marvin,[56] who recovered pure cultures of Pfeiffer's bacilli from lung cysts.

If the cyst ruptures into the pleural cavity, a hydrothorax results; or, if infected, a pyothorax results. If pneumatized tissue is encountered in rupture, air will be present above the fluid line.

## CLASSIFICATION

Cystic disease of the lung may be divided into two main varieties, (1) congenital and (2) acquired, either of which may be solitary or multiple. Anspach and Wolman [57] and Dubrow [58] have offered classifications according to the pathogenesis. We have delayed making a classification because we note that there is little difference between solitary and multiple cysts so far as their etiologic or pathologic manifestations are concerned. It is our opinion that any classification of cystic disease of the lung which goes beyond the division of congenital and acquired constitutes merely an enumeration of the different pathologic states that may develop in the progress of the growth. The diagrammatic illustration presented in figure 6 is derived from a study of our cases and a review of the literature as well.

*Classification of Lung Cysts*

- 1. Congenital lung cysts
  - Stop-valve obstruction
    - Solitary
      - Bronchial communication
        - 1. Check-valve obstruction — Expansile balloon cyst
        - 2. Bipass-valve obstruction — Nonexpansile air cyst; single or multiple
        - 3. Free large opening — Cough plus infection, with expectoration of fluid and germinative membrane (spontaneous cure)
    - Multiple
      - No bronchial communication
        - 1. Asymptomatic fluid cysts — Single or multiple; may or may not abort through visceral pleura with pedicle attachment
        - 2. Infection — Abscess or gangrene, with or without pleural rupture (pyopneumothorax)
- 2. Acquired lung cysts

## SYMPTOMATOLOGY

Unfortunately, there is no symptom or train of symptoms pathognomonic of lung cysts. Many congenital cysts without secondary infection are symptom free and may not be recognized at all, as in the cases of Miller,[31] Wood [32] and Pollock and Marvin.[56] The symptoms that usually bring the disease to mind are related to the infection present and to the changes produced in intrathoracic pressure following rupture into a bronchus.

According to the usual history, the patient has had recurring attacks of respiratory infections since the

40. Ribadeau-Dumas, L., and Rault, H.: Paris méd. **2:** 381 (Nov. 5) 1932.
41. Cautley, E.: Brit. J. Child. Dis. **21:** 138 (April-June) 1924.
42. Jackson, Chevalier: Mechanism of Physical Signs in Neoplastic and Other Diseases of Lung, J. A. M. A. **95:** 639 (Aug. 30) 1930.
43. Nelson, R. L.: J. Pediat. **1:** 233 (Aug.) 1932.
44. Jacobs, H. M.: Congenital Cyst of the Lung (Solitary), Am. J. Dis. Child. **48:** 457 (Aug.) 1934.
45. Hennel, Herman: Cystic Disease of the Lung, Arch. Int. Med. **57:** 1 (Jan.) 1936.
46. Zarfl, M.: Ztschr. f. Kinderh. **54:** 92, 1933.
47. Vollmer, Hermann: Ztschr. f. Kinderh. **46:** 810, 1928.
48. Schenck, S. G., and Stein, J. L.: Radiology **24:** 420 (April) 1935.
49. Basso, R.: Arch. ital. di anat. e istol. pat. **5:** 913 (Sept.-Oct.) 1934.
50. Paviott, M.: Lyon méd. **152:** 566, 1933.
51. Kleine, H. O.: München. med. Wchnschr. **77:** 110 (Jan. 17) 1930.
52. Mencarelli, Lodovico: Pathologica **24:** 763 (Nov. 15) 1932.
53. Sergent, Emile; Durand, H.; Kourilsky, R., and Patalano, R.: Bull. et mém. Soc. méd. d. hôp. de Paris **51:** 305 (March 4) 1935; Arch. méd.-chir. d. l'app. respir. **10:** 142, 1935.
54. Zdansky, E.: Röntgenpraxis **7:** 79 (Feb.) 1935.
55. Siems, H.: Beitr. z. Klin. d. Tuberk. **80:** 655, 1932.
56. Pollock, W. C., and Marvin, H. P.: Am. Rev. Tuberc. **27:** 59 (Jan.) 1933.
57. Anspach, W. E., and Wolman, I. J.: Surg., Gynec. & Obst. **56:** 635 (March) 1933.
58. Dubrow, J. L.: Radiology **24:** 480 (April) 1935.

early months of life and is first brought for examination because of an attack that was not unlike the previous ones until the child became dyspneic and cyanotic. The dyspnea, as a rule, is persistent, but the cyanosis is characterized by periods of remission. The child may recover spontaneously or may die during one of the attacks, as did one of the patients in this series. Large expansile cysts present this picture. Prior to the onset of cyanosis and dyspnea, one frequently obtains the history of a cough productive of a tenacious mucilaginous substance. The appearance of the fluid indicates the beginning of bronchial communication. Expectoration of blood-tinged pulmonary secretions, occasionally observed, is explained by rupture of the small adjacent vessels when coughing efforts increase the pericystic pressure. It should be remembered, however, that a cough is not always a symptom.

These patients are acutely ill at some stage of the disease. They appear lethargic, have anorexia, suffer

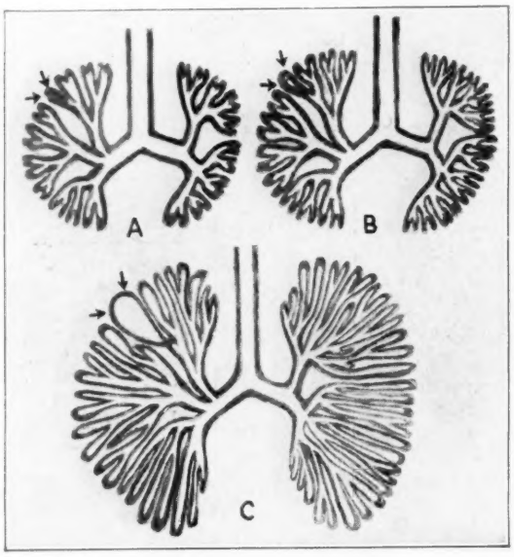


Fig. 5.—Diagrammatic illustration of embryonic ramifications of the bronchial tree: *A*, interrupted canalization of a ramification; *B*, canalization starts again distal to occlusion; *C*, fluid cyst formation.

with nausea and vomiting, either lose weight or fail to gain, and often show evidence of dehydration. These, however, cannot be labeled as prominent manifestations. The most one can say about the symptoms of cystic disease of the lung in children is that they coincide with those of pulmonary infection until the time the air chamber forms.

### DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS

In our review of the literature we were able to find only one instance in which a clinical diagnosis of uncomplicated lung cyst was made prior to roentgenologic examination, which demonstrates the significance of the rôle of roentgenology in the diagnosis. This is not surprising, since there is so little in the symptomatology and nothing in the physical changes pathognomonic of the disease. It is obvious, however, that the importance of the clinical record is becoming more apparent with the accumulation of reported cases.

A careful roentgenologic study includes examination with the fluoroscope in all positions, as well as films made in vertical, horizontal and lateral positions. One finds single or multiple, sharply defined intrapulmonary shadows having the density of either fluid or air, or both, with a fluid line.

Cystic disease of the lung should be suspected in infants and children who suffer repeated attacks of respiratory infections in which dyspnea and cyanosis are unduly prominent. The suspicion should be stronger when these appear immediately after the child has coughed or expectorated a quantity of albuminous fluid.

Small fluid cysts, per se, seldom produce physical signs. When large and located peripherally, regional dulness and diminished vocal and breath sounds are elicited but are subject to variation in the presence of secondary infection.

Balloon cysts produce the physical appearance of pneumothorax under pressure; i. e., bulging thoracic cage, limitation of motion, tympany on percussion, absent breath sounds, and contralateral displacement of the mediastinum and diaphragm. In the roentgenogram, the entire lung field may be replaced, and the normal convex mediastinal and diaphragmatic contours compressed into concave lines.

The diagnosis of balloon cysts should present little or no difficulty from the history and physical and roentgenologic examinations, but the dense intrapulmonary ovoid shadow of fluid cysts must be differentiated from pulmonary consolidation, atelectasis, interlobar sacculations of fluid, pleural empyema, pulmonary abscess, solid tumors, and cysts of the echinococcic and dermoid varieties.

Of the many perplexing problems offered in differential diagnosis, the one that we wish to stress is the distinction between fluid cysts and pneumonic processes. As previously pointed out, one is confronted with the clinical picture of pneumonia. Unfortunately, this diagnosis often is confirmed by the roentgenologist, who demonstrates a curvilinear density in the pulmonary field. Since the concurring pneumonitis frequently responds in a short time to the usual treatment, one is further deceived as to the original disease process. The child is pronounced cured, when another roentgenogram of the chest would show the persistence of the cystic opacity and give a clue to the diagnosis. This explains why the diagnosis is not made until rupture occurs, even though the history obtained relates repeated cycles of the course described.

Atelectasis, as a rule caused by a foreign body in a portion of the bronchial tree, can be distinguished in the majority of cases by the history, by bronchoscopy, and by the clinical progress.

We have observed interlobar sacculations of fluid which presented a clinical picture identical to that of fluid cysts, as well as similar intrapulmonary densities in the roentgenogram. Lateral views, however, illustrated the line of thickened interlobar pleura leading to the fluid accumulation, establishing its identity.

A secondarily infected cyst, or one with extensive surrounding infection, simulates lung abscess and localized empyema. Wood [32] emphasized the point that abscesses either regress or progress, and the change may be observed roentgenologically. Eloesser [59] directed attention to the wedge-shaped shadow of localized empyema as compared with the ovoid shadow of cysts. Bronchoscopic examination and visualization of the bronchial tree with iodized oil may be necessary. More often than not, exploratory thoracotomy is required for differentiation.

From solid tumors, which are more dense, more sharply defined and develop later in life, cysts may be distinguished by aspiration or at operation. Echino-

59. Eloesser, Leo: S. Clin. North America **8**: 1361 (Dec.) 1928; Surg., Gynec. & Obst. **52**: 747 (March) 1931.

coccic cysts usually appear in the lower lobes. If secretions are obtained either by aspiration or by expectoration, diagnostic hooklets may be found. The complement fixation test is useful in diagnosis. Urticaria and eosinophilia are distinctive features. Dermoid cysts originate generally near the mediastinum and do not develop until the age of puberty. Hair may be recovered from discharged cystic secretions. Too, roentgenograms may reveal dense structures, such as teeth and bone. Elimination of these various types, therefore, should not be difficult in the differential diagnosis.

### TREATMENT

The kaleidoscopic clinical course, as well as the character, extent and location of the lesion, presents a difficult therapeutic problem. The measures employed depend on the age of the patient and the stage to which the disease has progressed at the time of discovery.

Asymptomatic fluid cysts are dealt with principally by prophylaxis or prompt therapeusis of concomitant respiratory infections. Therefore, rigid clinical and roentgenologic observation is indicated until the patient reaches an age when surgery may be safely undertaken. This allows a period of time to elapse during which a spontaneous cure may be established.

Miller,[31] Zdansky,[54] Melchior,[60] Sauerbruch,[61] Braeuning,[62] Harrington[63] and Clairmont[64] have found removal of fluid cysts in toto eminently effective in selected cases. Lobectomy has also proved satisfactory. When infection exists, treatment as for any lung abscess is indicated.

In balloon cysts, thoracentesis has been employed successfully by Croswell and King,[12] Vollmer[47] and Fleming,[65] but was ineffectual in cases of Pearson[13] and Wood.[32] It may serve, however, to prevent a fatal accident until more radical measures can be applied. Adams[66] emphasized the importance of attaching to the needle a rubber tube and placing its end under water, thus maintaining equalized intrathoracic pressure. Iodized oil should be injected into the cyst at the first thoracentesis. Single aspirations are of no value; in fact, they may prove harmful.

Surgery probably will meet the demand for cure of expansile cysts. However, Eloesser's[59] patient died of postoperative shock when a balloon cyst was removed, and Graham[66] was unsuccessful in his attempt to suture the bronchial opening by way of the transthoracic route. The use of the thoracoscope, or straight cystoscope, and cauterization of the aperture with sclerosing solutions or other destructive agencies, according to the method of Adams,[66] seems to us the most logical and hopeful surgical approach.

Multiple cysts lend themselves less readily to therapy than do solitary cysts. Should these lesions fail to respond to sclerosing solutions, surgery is the best treatment. Operation is likewise necessary in the majority of cases complicated by infection. Many patients, however, show little effect of the infection, as is shown in reports by Gibson,[67] Ehlers[68] and Miller.[31] The most popular procedures are postural and bronchoscopic drainage, and vaccines. These, however, are seldom curative. When the cysts involve an accessible portion of the lung, lobectomy may be employed. Phrenic interruption has been attempted in an effort to collapse the cavity. Pneumothorax has been tried, but with dubious success.

60. Melchior, E.: Zentralbl. f. Chir. **56:** 2626 (Oct. 19) 1929.
61. Sauerbruch, Ferdinand: Die Chirurgie der Brustorgane, ed. 3, Berlin, Julius Springer, 1928, p. 869.
62. Braeuning, H.: Ztschr. f. Tuberk. **73:** 106, 1935.
63. Harrington, S. W.: Ann. Surg. **96:** 843 (Nov.) 1932; Surgical Treatment of Intrathoracic Tumors, Arch. Surg. **19:** 1679 (Dec., pt. 2) 1929.
64. Clairmont, P.: Deutsche Ztschr. f. Chir. **200:** 157, 1927.
65. Fleming, G. B.: Arch. Dis. Childhood **9:** 201 (Aug.) 1934.
66. Quoted by Pearson.[13]
67. Gibson, D. N.: Am. J. Roentgenol. **22:** 155 (Aug.) 1929.
68. Ehlers, H. W. E.: Deutsche Ztschr. f. Chir. **213:** 189, 1929.

### PROGNOSIS

An analysis of the reported cases of congenital lung cysts indicates a high mortality rate in infants and children. Of the total of 152 reported since 1925, forty-six of the patients were under 3 years of age. Of the forty-six, thirty-six are dead. A record of cure is available in only seven of the remaining ten. We note, however, that a far higher percentage of deaths occur in the first two years of life, probably because of the poorly developed accessory muscles of respiration, the flexible infant mediastinum, and the inability of the lung tissue to withstand the pericystic pressure. The overwhelming infection present in some cases is also a factor.

Fluid cysts, it seems, do not of themselves carry a grave outlook, but the development of infection and the establishment of bronchial communication are fatal complications.

It follows, then, that the prognosis of a given case of congenital lung cyst, like the treatment, is governed by the age of the child and the stage of the disease when recognized.

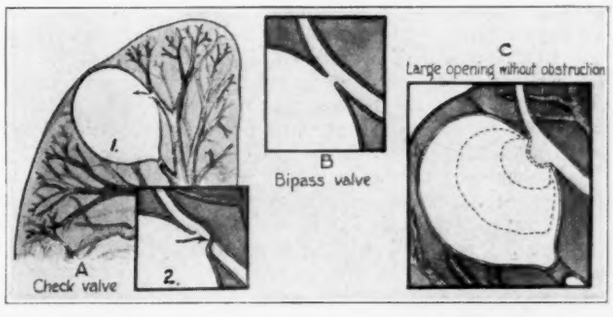


Fig. 6.—Mechanism of action of the types of bronchial communication. *A* 1, check valve allows ingress of air on inspiration; *A* 2, expiration—closure of bronchial opening by flap prevents egress resulting in expansile air cyst. *B*, bipass valve allows ingress and egress of air; result, nonexpansile air cyst. *C*, large free opening results in collapse of cyst with spontaneous recovery.

### SUMMARY AND CONCLUSIONS

Although an increase in reported cases of congenital cystic disease of the lung has occurred during the past decade, many more probably would be discovered if the condition were kept in mind and the proper method of examination employed. We have discussed the embryologic, physiologic and pathologic background of the disease and presented a graphic outline of the various states encountered in its course. It is our opinion that the condition is the result of some anomaly that interrupts the canalization of a ramification in a bronchial radicle in the embryo and that the portion thus separated later develops into a stunted structure retaining bronchial characteristics, the entrapped secretory mucosa of which furnishes the fluid for the cyst found at birth. The subsequent clinical behavior has no bearing on the congenital factors of its production but is dependent on the development and extent of infection and, if any, the type of bronchial communication established.

The symptomatology, diagnosis, differential diagnosis and methods of treatment have been presented in detail. We wish to stress, particularly, the point that, once a diagnosis is made, a careful clinical and roentgenologic

observation, with prophylaxis against infection, should be carried out in these patients until they reach an age when procedures in thoracic surgery may replace the less efficacious palliative efforts to cure a condition of grave prognosis.

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## ABSTRACT OF DISCUSSION

DR. L. R. SANTE, St. Louis: We have all been guilty in the past of calling certain shadows, especially along the side of the mediastinum, localized pleural effusions when they really were cysts of the lung. Whether it is lined with a secreting membrane or not it is impossible to tell in the roentgenogram. Due consideration of the clinical symptoms will aid in the differentiation. The fullest consideration of the clinical history and the subsequent developments of the case is always essential for the differentiation of this condition. If there is associated infection of the cystic area, it may be impossible from the roentgenogram alone to make a differential diagnosis. If, however, there are relatively few symptoms and signs and the case is observed over a considerable time under varying conditions of distention of the cyst with fluid, the diagnosis at least becomes presumptive. The absolute proof is dependent on conditions found at the autopsy. The expansile air cyst of the lung gives an entirely different picture. This type has been most frequently encountered in the very young. One must not get the wrong impression about the formation of balloon cysts of the lung as to how much they inflate and as to the mechanism by which inflation takes place. A check valve may give the impression that with every respiration the balloon cyst gets larger and larger until it ruptures. This can hardly be the case mechanically, because air enters the lung at all only by reason of the enlargement of the thoracic cage, and the amount of distention is dependent on its enlargement as exerted against the counter force of the elasticity of the lung, so that in the case of a cyst the thickness of the wall and its elasticity seem to be the determining factors as to how large it will get as the result of inspiration. After it has attained that size, and after that pressure has been equalized, it never gets any larger by subsequent respiration. It does have the effect of increasing the pressure in this area, however, so as to inhibit subsequent secretion from the living membrane, and perhaps that is the reason it remains an air cyst. Injection of iodized oil in a certain type of cases gives the typical appearance of bronchiectasis. I believe these represent multiple cystic areas, intimately connected with the bronchi, which leave, as is evident, free ingress and egress of air and yet actually maintain themselves as cystic areas in the lung.

DR. JAMES L. DUBROW, Des Moines, Iowa: I saw a patient hospitalized for five months in the orthopedic ward, who developed a sudden dyspnea although there was no history of any previous pulmonary or heart disease. Based on the physical examination and the bedside chest film he undoubtedly had spontaneous pneumothorax. He seemed fairly comfortable but died a few hours later in spite of treatment. Autopsy showed displacement of the heart and the mediastinum to the right side with much air in the left pleural cavity. The collapsed left lung showed numerous air cysts, the right lung also showing a few. I cannot state whether these cysts are congenital, not having as yet conclusive histopathologic data on the case.

DR. CARLETON B. PEIRCE, Ann Arbor, Mich.: I feel that, considering the rapidity with which the lung will excavate in a certain area following a lobular pneumonia or bronchopneumonia and develop cysts or a cyst in that area, the production of such a cystic area is entirely too common to permit one to call a great many of these "congenital cysts." Furthermore there is usually not much information about these youngsters until a certain age period. It seems to me that we must be extremely cautious in calling these congenital cysts. I am inclined to believe that most of the pneumocysts are acquired.

DR. LEO G. RIGLER, Minneapolis: I reported a case in which I was able to observe this phenomenon of destruction, mentioned by Dr. Peirce, occurring in staphylococcic pneumonia, which eventually produced a typical picture of a lung cyst in an adult. There is no doubt that this type of check valve obstruction of the bronchus may occur; with a previous excavation of the lung from some inflammatory process a cavity may remain, and what is exactly similar to a cyst may remain and continue to fill with air because of the change in the bronchus. It takes a good deal of evidence to demonstrate clearly that these are not acquired.

DR. J. CASH KING, Memphis, Tenn.: One reason for making this presentation was the fact that we had discovered this one case in which we were able to study the fluid cyst in a young child and then to see it pass on into the expansile stage. I agree that there are many cases of apparently acquired lung cyst. We refer to them as emphysematous air sacs and we have seen them form within a short period of time and disappear in an equally short period. They were caused by the check valve type of occlusion, the result of a pathologic condition. Fluid cysts exist in many cases at birth, and they have been found in embryos to form prior to the time alveolar tissue develops. And in those patients who have lived they do not show pigmentation within the cystic area, even though this is present in the remaining lung tissue, which shows that they must be present. We have had some discussion with reference to the possibility of these lung cysts collapsing. Many authors have not seen a case in which the cyst has collapsed, and from the appearance of the autopsy specimens of the cases that have been present for a long time it would seem as though it would be impossible for that cyst cavity to collapse. In infants, however, it does not exist over too long a period, as shown in the second case reported. These cystic cavities will collapse completely and leave little or no evidence of their presence. We did not attempt to discuss the treatment but I want to emphasize the idea that treatment of fluid cysts encountered in small infants should be prophylactic, infection being warded off in every way possible. If necessary, more radical measures may be used to eradicate the cyst at a later period.

# THE RELATIVE IN VITRO ACTIVITY OF CERTAIN ANTISEPTICS IN AQUEOUS SOLUTION

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In the past ten years, innumerable articles concerning antiseptics have been published. Hardly a year passes without the appearance of a new proprietary bactericide. In advertisements in medical journals, magazines and newspapers and even in programs over the air the marvelous germ-killing properties of this or that antiseptic are brought to one's attention. Less credulous physicians are puzzled as to the solution of choice, whereas the more credulous are easily influenced by the astonishing claims of the manufacturers of certain solutions. One only needs consult the pharmacist of a large general hospital to learn of the many kinds of antiseptic solutions that are demanded by different staff physicians.

The experiments subsequently described were undertaken in an effort to determine the relative in vitro activity of certain proprietary and nonproprietary solutions which are ordinarily used as antiseptics for minor wounds and for irrigations. It is hoped that the accumulated data will serve to point out the discrepancies between the claims for certain proprietary solutions and the experimental facts and will enable the practicing physician to use and to recommend the use of antiseptics more advisedly.

What are the prerequisites of a solution of this sort? Although bactericidal action, as determined in the usual way, is of primary importance in evaluating the value of any antiseptic, this property alone is of

From the Mallory Institute of Pathology, Boston City Hospital.

relatively little significance when applied to solutions to be used in wounds, on cuts and abrasions or for irrigations. In all these instances the antiseptic is in contact with blood, lymph, tissue juice or secretions of the mucous membranes and its bactericidal power must be measured in the presence of one or another of these substances. This type of antiseptic should possess a certain degree of penetration. Ideally, it should be able to kill bacteria in at least as high a dilution as it does normal tissue cells—in other words, its toxicity for tissue cells should be no greater than its bactericidal power. Finally, its cost should be reasonable.

As has already been mentioned, hundreds of articles have appeared in medical literature during the past ten years in which one or more of these essential properties have been determined. Such papers have usually featured one antiseptic, and comparison has been made with only a few other solutions. Furthermore, effective dilutions have always been expressed in terms of the solid salt or compound. This is apt to be misleading, for dilutions in such instances are significant only when the usable dilution is taken into account. For example, usable dilutions of compound solution of iodine, U. S. P., and mercury bichloride are 1:20 and 1:1,000, respectively. If it is assumed that the highest bactericidal dilutions are found to be 1:4,000 and 1:20,000, respectively, at a casual glance it would appear that the mercury bichloride solution is five times as bactericidal as the iodine solution. The iodine solution, however, is actually ten times as strong as the mercury bichloride solution, for 1:4,000 is a 1:200 dilution of the usable strength of the former and 1:20,000 is a 1:20 dilution of the usable strength of the latter. In other words, the usable iodine solution can be diluted 200 times and still be bactericidal, whereas the usable mercury solution can be diluted only twenty times.

As alcohol or alcohol and acetone are undesirable and unnecessary in antiseptic solutions for minor wounds and irrigations and, in addition, are of themselves bactericidal in low dilutions, aqueous solutions, with two exceptions, were employed in the series. The different antiseptics are herewith listed:

### LIST OF ANTISEPTICS EMPLOYED

All proprietary solutions were purchased, when possible, in the open market. The nonproprietary solutions were prepared in this laboratory. In each instance the usable strength is given. The dilutions noted in the subsequent results refer to dilutions of the respective usable dilutions.

#### SOLUTIONS CONTAINING IODINE

1. Compound solution of iodine, U. S. P. Usable strength undiluted. Iodine content 5 per cent (1:20) when titrated with a standardized tenth normal sodium thiosulfate solution.

2. Iodine solution (nonalcoholic). Usable strength undiluted. Iodine content 0.78 per cent (1:128), titrated as above. Submitted by Amend Laboratories, Inc., New York.

3. Compound solution of iodine, U. S. P., diluted 1:6.4. Usable strength undiluted. Iodine content 0.78 per cent (1:128), titrated as above.

4. Compound solution of iodine, U. S. P., diluted 1:27.8. Usable strength undiluted. Iodine content 0.18 per cent (1:555), titrated as above.

#### SOLUTIONS CONTAINING MERCURY

1. Metaphen (1:500). Usable strength undiluted. Manufactured by Dermatological Research Laboratories, Philadelphia.

2. Merthiolate (1:1,000). Usable strength undiluted. Manufactured by Eli Lilly & Co., Indianapolis.

3. Mercurochrome (1:50). Usable strength undiluted. Salt manufactured by Hynson, Westcott & Dunning, Inc., Baltimore. Solution prepared in the dispensary, Boston City Hospital.

4. Mercuric oxycyanide ("containing mercury cyanide"-Merck) (1:4,000). Usable strength undiluted.

5. Mercury bichloride (Vaichulis-Arnold modification,[1] aqueous) (1:1,000). Usable strength undiluted.

6. Merphenyl nitrate (1:1,500). Usable strength undiluted. Obtained through the courtesy of Hamilton Laboratories, Inc., Hamilton, Ohio.

7. Merphenyl borate (1:500). Usable strength undiluted. Obtained through the courtesy of Hamilton Laboratories, Inc., Hamilton, Ohio.

#### SOLUTIONS CONTAINING CHLORINE

1. Zonite. Usable strength 1:2. Available chlorine content (diluted) 0.53 per cent (1:190), titrated, after conversion to iodine, with a standardized tenth normal sodium thiosulfate solution. Manufactured by Zonite Products Corporation, New Brunswick, N. J.

2. Apco No. 25, diluted 1:8.3. Usable strength undiluted. Available chlorine content 0.39 per cent (1:260), titrated as above. Dilution made in the dispensary, Boston City Hospital. Manufactured by Ampere Products Company, West Orange, N. J.

#### MISCELLANEOUS SOLUTIONS

1. Hexylresorcinol (1:1,000). Usable strength undiluted. Manufactured by Sharp & Dohme, Baltimore.

2. Listerine (25 per cent alcohol). Usable strength undiluted. Manufactured by Lambert Pharmacal Company, St. Louis.

3. Pepsodent (25 per cent alcohol). Usable strength undiluted. Manufactured by Pepsodent Company, Chicago.

All these antiseptics were tested simultaneously for (1) bactericidal activity, (2) bactericidal activity in mixtures containing 50 per cent horse serum, (3) diffusibility and (4) toxicity. In addition, figures representing unit costs were obtained. The methods employed and the results obtained are given in the following sections.

### BACTERICIDAL ACTIVITY

As a measure of bactericidal activity the "F. D. A. method (special) S. aureus, 37 C.," as recommended by the Food and Drug Administration and described in circular 198 (December 1931), U. S. Department of Agriculture, was followed explicitly with two exceptions. In the first place, the highest dilution killing in five minutes was considered the limit of bactericidal activity, rather than the highest dilution killing in ten minutes but not in five minutes. This modification seemed advisable for two reasons; namely, that the effective action of any antiseptic in the ordinary wound was probably less than ten minutes and that the technic of the test was simplified. Secondly, standardized pipets were not used in making the dilutions, as it was felt that the accuracy so afforded was not necessary when equal amounts of diluent were added for succeeding dilutions. The culture of Staphylococcus aureus was obtained from the Food and Drug Administration Laboratories in Washington. In all the separate tests for bactericidal activity and in all subsequent tests in which live bacteria were used, the resistance of the culture was assured by control tests with 1:80 and 1:90 dilutions of phenol, prepared from a standardized 5 per cent phenol solution.

The method, in brief, consists of adding 0.5 cc. of a twenty-two to twenty-six hour culture of Staphylo-

1. Vaichulis, J. A., and Arnold, L.: Compound Colored Alcoholic Solution of Mercuric Chloride for Skin Disinfection, Surg., Gynec. & Obst. **61**: 333 (Sept.) 1935.

coccus aureus of standard resistance to 5 cc. of increasing dilutions of each antiseptic. After incubating in a water bath at 37 C. for exactly five minutes, one 4 mm. platinum loopful is transferred to 10 cc. of beef extract broth, prepared with a special batch of peptone (Armour's). After completion of these transfers, four 4 mm. loopfuls are transferred from the first tube to a second tube of broth. The latter is a modification suggested by Shippen [2] to eliminate the bacteriostatic effects of many of the mercury compounds. All tubes are incubated at 37 C. for forty-eight hours. The effective killing dilution is the highest dilution from which transfers failed to grow in both tubes.

fluid of a twenty-four hour culture of Staphylococcus aureus, which had been slowly centrifugated for five minutes. This amount of culture was approximately seven times the minimum amount of the culture that would grow in control broth tubes. As will be seen from table 1, none of the solutions showed bacteriostatic effects except those of the mercury group. All but one of the latter were bacteriostatic, but the effect was less marked than that shown by the first transfers. This was most probably due to the combination of the effective traces of mercury in the higher dilutions with the protein substances in the broth during the primary incubation period.

TABLE 1.—*Bactericidal Activity*

| Antiseptic Solutions | Dilutions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | W | 1/2 | 1/4 | 1/8 | 1/16 | 1/32 | 1/64 | 1/128 | 1/256 | 1/512 |
| Iodine solutions | | | | | | | | | | |
| Compound solution of iodine, U. S. P. (1:20) | .... | . .. | .... | .... | .... | .... | .... | .... | **0+/0** | +/− |
| Iodine solution, Amend (1:128) | .... | .... | .... | .. . | .... | **0+/0** | +/− | .... | .... | .... |
| Compound solution of iodine diluted 1:6.4 (1:128) | .... | .... | .... | .... | .... | **0+/0** | +/− | | | |
| Compound solution of iodine diluted 1:27.8 (1:555) | .... | .... | . .. | **0+/0** | +/− | | | | | |
| Mercury solutions | | | | | | | | | | |
| Metaphen (1:500) | **0⁰/0** | 0⁰/+ | 0⁰/+ | 0⁰/+ | 0+/− | 0+/+ | +/− | | | |
| Merthiolate (1:1,000) | 0⁰/+ | 0⁰/+ | 0⁰/+ | +/− | | | | | | |
| Mercurochrome (1:50) | 0⁰/+ | 0⁰/+ | 0⁰/+ | +/− | | | | | | |
| Mercuric oxycyanide (1:4,000) | +/− | | | | | | | | | |
| Mercury bichloride, V-A (1:1,000) | .... | .... | . .. | **0+/0** | +/− | | | | | |
| Merphenyl nitrate (1:1,500) | 0⁰/+ | 0⁰/+ | 0+/− | 0+/+ | +/− | | | | | |
| Merphenyl borate (1:500) | .... | **0⁰/0** | **0⁰/+** | 0+/+ | 0+/− | 0+/− | +/− | | | |
| Chlorine solutions | | | | | | | | | | |
| Zonite diluted 1:2 (1:190) | .... | .... | .... | .... | .... | .... | **0+/0** | +/− | | |
| Apco no. 25 diluted 1:8.3 (1:260) | .... | .... | .... | .... | .... | **0+/0** | +/− | | | |
| Miscellaneous solutions | | | | | | | | | | |
| Hexylresorcinol (1:1,000) | .... | .... | **0+/0** | +/− | | | | | | |
| Listerine (25 per cent alcohol) | **0+/0** | +/− | | | | | | | | |
| Pepsodent (25 per cent alcohol) | .... | .... | .... | **0+/0** | +/− | | | | | |

Numerator = result of first transfer; denominator = result of second transfer; 0 = no growth; + = growth; boldface type = highest bactericidal dilution; exponential sign = result of reinoculation of first transfer.

The results are shown in table 1. Compound solution of iodine, U. S. P., was by far the most effective. The bactericidal activity of the other solutions containing iodine was directly proportional to their iodine content. In all an actual iodine concentration of about 1:4,500 killed the cocci. Solutions containing chlorine came next in effectiveness, then the miscellaneous group and finally the mercury compounds. The last group showed considerable bacteriostatic power, but actual killing was accomplished by only three, of which one had to be used undiluted and another diluted only 1:2.

To recheck on bacteriostatic effects, all first transfers failing to grow in forty-eight hours were reinoculated with one drop of a $10^{-3}$ dilution of the supernatant

2. Shippen, L. P.: A Fallacy in the Standard Methods of Examining Disinfectants, Am. J. Pub. Health **18**: 1231 (Oct.) 1928.

### BACTERICIDAL ACTIVITY IN MIXTURES CONTAINING FIFTY PER CENT HORSE SERUM

Each antiseptic was mixed with an equal amount of horse serum, which had been sterilized by passage through a Berkefeld filter. This mixture was allowed to stand at room temperature (about 22 C.) for approximately sixty minutes. Dilutions were then made with sterile 0.85 per cent salt solution and their bactericidal activities were determined by using the same method as in the previous tests.

The results are shown in table 2. As the antiseptics were diluted 1:2 with the horse serum, this is obviously the lowest dilution that could be tested. The three strongest iodine solutions were the only ones that retained bacteria-killing power in the presence of serum. The activity of the strongest as compared with its activity in the absence of serum was unaffected,

whereas with the two weaker solutions the next lower dilution was required to kill. With the weakest iodine solution, even the second lower dilution was ineffective. This suggested that the weaker the iodine solution the greater the percentage neutralization of the iodine by the serum. In order to confirm this observation, mixtures of equal parts of horse serum and compound solution of iodine, U. S. P., undiluted and diluted 1:8 and 1:32, were made and the amounts of iodine in samples removed at seven minutes, one hour, two hours and three hours were titrated with tenth normal sodium thiosulfate. The results of these titrations are shown in table 3. The total amount of free iodine in each at the end of one hour was decreased 23, 58 and 85 per cent, respectively. These figures correspond to the observed changes in bactericidal activity of the iodine solutions brought about by the addition of 50 per cent horse serum.

TABLE 2.—*Bactericidal Activity of Mixtures Containing 50 Per Cent Horse Serum*

| Antiseptic Solutions | Final Dilutions 1/2 | 1/4 | 1/8 | 1/16 | 1/32 | 1/64 | 1/128 | 1/256 | 1/512 |
|---|---|---|---|---|---|---|---|---|---|
| **Iodine solutions** | | | | | | | | | |
| Compound solution of iodine, U. S. P. (1:20) | .... | .... | .... | .... | .... | .... | .... | **0●** / 0 | + |
| Iodine solution, Amend (1:128) | .... | .... | .... | 0 / 0 | +● | | | | |
| Compound solution of iodine diluted 1:6.4 (1:128) | .... | .... | .... | 0 / 0 | +● | | | | |
| Compound solution of iodine diluted 1:27.8 (1:555) | — | ..... | ● | | | | | | |
| **Mercury solutions** | | | | | | | | | |
| Metaphen (1:500) | 0 / + | | | | | | | | |
| Merthiolate (1:1,000) | — / — | | | | | | | | |
| Mercurochrome (1:50) | 0 / + | | | | | | | | |
| Mercuric oxycyanide (1:4,000) | + / — | | | | | | | | |
| Mercury bichloride, V-A (1:1,000) | 0 / — | .... | ● | | | | | | |
| Merphenyl nitrate (1:1,500) | 0 / + | | | | | | | | |
| Merphenyl borate (1:500) | **0●** / + | | | | | | | | |
| **Chlorine solutions** | | | | | | | | | |
| Zonite diluted 1:2 (1:190) | + / — | .... | .... | .... | .... | ● | | | |
| Apco no. 25 diluted 1:8.3 (1:260) | + / — | .... | .... | .... | ● | | | | |
| **Miscellaneous solutions** | | | | | | | | | |
| Hexylresorcinol (1:1,000) | + / — | ● | | | | | | | |
| Listerine (25 per cent alcohol) | + / — | | | | | | | | |
| Pepsodent (25 per cent alcohol) | + / — | .... | ● | | | | | | |

Numerator = result of first transfer; denominator = result of second transfer; 0 = no growth; + = growth; boldface type = highest bactericidal dilution; ● = bactericidal potency in the absence of serum.

Titrations of available chlorine in a mixture of equal parts of horse serum and one of the chlorine solutions showed a diminution in one hour of less than 50 per cent. Bactericidal activity, however, was diminished more than 95 per cent. This would seem to indicate that some combination or reaction had taken place which rendered the antiseptic ineffectual as a bacteria-killing agent, in spite of the persistence of presumably adequate amounts of available chlorine.

### DIFFUSIBILITY

Parlodion sacs were made in test tubes having an internal diameter of 16 mm. The solution used was prepared by dissolving 30 Gm. of Parlodion (Mallinckrodt) in 250 cc. of a mixture of equal parts of ethyl alcohol and sulfuric ether. Each sac was standardized for its permeability by determining the amount of iodine passing into the dialysate from a measured amount of compound solution of iodine, U. S. P., in a definite period of time. Only sacs deviating less than 25 per cent above or below the arbitrarily chosen standard were used in the test.

The sacs were sterilized by immersion in a 1:25 dilution of compound solution of iodine, U. S. P., over night. A calculated amount of sterile tenth normal sodium thiosulfate was added which was slightly in excess of that needed to remove the free iodine. After the iodine color had disappeared from outside and inside the sacs, each was washed twice in sterile distilled water and blotted relatively dry between large sheets of sterile filter paper. Twelve cubic centimeters of antiseptic was placed in each sac and the sac placed in a 150 by 25 mm. test tube containing an equal

TABLE 3.—*Percentage Interval Decrease in the Iodine Content of Mixtures Containing Equal Parts of Horse Serum and of Different Dilutions of Compound Solution of Iodine*

| Iodine Solution | Percentage Decrease 7 Min. | 1 Hr. | 2 Hr. | 3 Hr. |
|---|---|---|---|---|
| Compound solution of iodine, U. S. P. .... | 12 | 23 | 27 | 28 |
| Compound solution of iodine diluted 1:8... | 39 | 58 | 69 | 73 |
| Compound solution of iodine diluted 1:32.. | 64 | 85 | 90 | 94 |

amount of sterile 0.85 per cent salt solution for exactly five minutes. To promote more efficient diffusion, the sac was partially and rapidly removed and immersed ten times at two minutes, four minutes and four and one-half minutes after the start of the dialysis. The fluid levels inside and outside the sac were approximately equal. The dialysate was tested for bactericidal activity by the "F. D. A. (special) S. aureus, 37 C." method, except that dilutions were made with sterile salt solution rather than with sterile water.

The results are given in table 4. Only five of the dialysates were bactericidal. The three strongest iodine solutions had diffusion rates of 12.5 per cent. One

and resuspending in 5 cc. sterile Locke's solution. The cocci were killed by heating for six hours at 53 C. The tubes were then slowly rocked in an incubator room at 37 C. for twenty minutes. Smears were made on slides and these were stained with Wright's stain. The slides were examined microscopically and the number of neutrophilic polymorphonuclear leukocytes judged to be dead or badly injured at the time the bacteria were added was determined. Cells containing no cocci or only two or three were considered functionally inactive. Those containing moderate numbers of cocci were also noted, as these seemed to be cells that were active at the time the suspension was added but were subse-

TABLE 4.—*Diffusibility*

| Antiseptic Solutions | Dilutions of Dialysate: W | 1/2 | 1/4 | 1/8 | 1/16 | 1/32 | 1/64 | 1/128 |
|---|---|---|---|---|---|---|---|---|
| **Iodine solutions** | | | | | | | | |
| Compound solution of iodine, U. S. P. (1:20) | .... | .... | .... | .... | **0/0** | + | .... | • |
| Iodine solution, Amend (1:128) | 0/0 | + | .... | • | | | | |
| Compound solution of iodine diluted 1:6.4 (1:128) | .... | 0/0 | + | .... | • | | | |
| Compound solution of iodine diluted 1:27.8 (1:555) | + | .... | • | | | | | |
| **Mercury solutions** | | | | | | | | |
| Metaphen (1:500) | 0/+ | | | | | | | |
| Merthiolate (1:1,000) | + | | | | | | | |
| Mercurochrome (1:50) | + | | | | | | | |
| Mercuric oxycyanide (1:4,000) | + | | | | | | | |
| Mercury bichloride, V-A (1:1,000) | 0/c | + | • | | | | | |
| Merphenyl nitrate (1:1,500) | + | | | | | | | |
| Merphenyl borate (1:500) | +• | | | | | | | |
| **Chlorine solutions** | | | | | | | | |
| Zonite diluted 1:2 (1:190) | + | .... | .... | .... | .... | • | | |
| Apco no. 25 diluted 1:8.3 (1:260) | 0/0 | + | .... | .... | • | | | |
| **Miscellaneous solutions** | | | | | | | | |
| Hexylresorcinol (1:1,000) | + | • | | | | | | |
| Listerine (25 per cent alcohol) | + | | | | | | | |
| Pepsodent (25 per cent alcohol) | + | .... | • | | | | | |

Numerator = result of first transfer; denominator = result of second transfer; 0 = no growth; + = growth; boldface type = highest bactericidal dilution; • = bactericidal potency, if diffusion 100 per cent.

of the mercury solutions had a rate of 25 per cent, which was not surprising in view of the fact that it was a solution of an inorganic salt which was probably highly ionized because of the presence of a small percentage of hydrochloric acid. One of the chlorine solutions showed 6.25 per cent diffusion.

### TOXICITY

Mixtures of 0.25 cc. each of freshly defibrinated human blood and of different dilutions of the antiseptic solutions, prepared with Locke's solution as a diluent, were incubated in a water bath at 37 C. for exactly ten minutes. Then to each was added one drop of a heavy suspension of killed Staphylococcus aureus. This suspension was prepared by washing down with sterile 0.85 per cent salt solution the growth from two large agar slants (in 200 by 25 mm. test tubes), centrifugating, washing two more times with salt solution

quently killed or injured. Ruptured cells were not included in the counts. With each different lot of defibrinated blood, controls with Locke's solution were made. These invariably showed practically all the polymorphonuclear leukocytes packed with cocci. Occasional small dead cells (from 2 to 4 per cent) with multilobulated nuclei were found in the controls. To control the primary toxicity of the potassium iodide in the compound solution of iodine, U. S. P., tests were carried out with a 5 per cent solution of iodine in 10 per cent sodium iodide.

The results of these tests are summarized in table 5. The toxicities of the iodine solutions were directly proportional to their iodine content. The leukocytes withstood a primary iodine concentration of about 1:1,100 for ten minutes. The iodine solution made with sodium iodide had a toxicity identical with that

of compound solution of iodine, U. S. P. The chlorine solutions were extremely toxic and the mercury solutions varied from no toxicity to moderate toxicity. The miscellaneous solutions were only moderately toxic. The two containing alcohol behaved quite similarly in that there were many secondarily killed leukocytes, which suggests that the alcohol or some other common ingredient was responsible. Cells killed after the addition of the cocci were also noted in preparations from both chlorine solutions and two of the mercury solutions.

A consideration of the toxicity of each antiseptic as compared with the bactericidal activity is of the utmost practical significance. The results given in table 2 cannot be taken as comparative measures of bactericidal activity, for the method varied considerably from that used in determining toxicity. In order to make an equitable comparison, the bactericidal test was repeated, mixtures of equal amounts (0.5 cc.) of sterile defibinated human blood in which the leukocytes were dead and three dilutions of the antiseptic solutions being used. The latter were such that the highest dilution was the lowest permitting the survival of 50 per cent of the leukocytes and the other two were the two next stronger. With nontoxic solutions only the undiluted antiseptic was used. The culture of Staphylococcus aureus was mixed with defibrinated blood so that each 0.6 cc. of the mixture contained 0.5 cc. of blood and 0.1 cc. of culture. Transfers were made after ten minutes' incubation at 37 C. Second transfers were made in the usual way. Stained smears of the blood and culture mixture showed no phagocyted cocci.

The results are given in table 5. It will be seen that neither the strongest dilutions permitted survival of the leukocytes, nor those twice as strong that killed over 50 per cent of the leukocytes were able to kill all the staphylococci. With the three strongest iodine solutions the staphylococci were killed in the mixtures made with the lowest dilutions. None of the mixtures with the other antiseptics were bactericidal. In three, which had such a high toxicity that mixtures with the undiluted solution were not included in the test, such mixtures were tried, and even these failed to show killing power.

As a further check on toxicity, 0.2 cc. amounts of different dilutions of all the solutions were injected intradermally on the cleanly shaved abdomens of several rabbits. White rabbits of approximately the same age and size were used for each test, and 24 gage needles were used for each injection. All the undiluted antiseptics caused necrosis. Dilutions of each were made until no lesion or a questionable lesion was observed at the site of inoculation six days after the injection. The lowest dilution producing no necrosis was taken as the nontoxic intradermal dose.

TABLE 5.—*Leukocytic Toxicity and Bactericidal Activity in Mixtures Containing 50 Per Cent Whole Blood: Intradermal Toxicity*

| Antiseptic Solutions | Final Dilutions 1/2 | 1/4 | 1/8 | 1/16 | 1/32 | 1/64 | 1/128 | Nontoxic Intradermal Dose |
|---|---|---|---|---|---|---|---|---|
| **Iodine solutions** | | | | | | | | |
| Compound solution of iodine, U. S. P. (1:20) | .... | .... | .... | 0 | 100+ | **20+** / 2 | **4** / 0 | 1:64 |
| Iodine solution in 10% NaI (1:20) | .... | .... | .... | .... | 100 | **20** / 2 | **4** / 0 | |
| Iodine solution, Amend (1:128) | 0 | 100+ | **8+** / 0 | 0 / 0 | .... | .... | .... | 1:16 |
| Compound solution of iodine diluted 1:6.4 (1:128) | 0 | 98+ / 0 | **20+** / 0 | 4 / 0 | .... | .... | .... | 1:16 |
| Compound solution of iodine diluted 1:27.8 (1:555) | 8+ / 20 | 0 / 0 | .... | .... | .... | .... | .... | 1:2 |
| **Mercury solutions** | | | | | | | | |
| Metaphen (1:500) | 100+* | 60+* / 24 | **4+** / 0 | .... | .... | .... | .... | 1:32 |
| Merthiolate (1:1,000) | 100+ | **0+** / 8 | .... | .... | .... | .... | .... | 1:8 |
| Mercurochrome (1:50) | + | + | 100+ | **0+** / 0 | .... | .... | .... | 1:16 |
| Mercuric oxycyanide (1:4.000) | 12+ / 8 | .... | .... | .... | .... | .... | .... | 1:8 |
| Mercury bichloride, V-A (1:1,000) | 100+* | **4+** / 4 | .... | .... | .... | .... | .... | 1:32 |
| Merphenyl nitrate (1:1,500) | 50+ / 4 | 4 / 0 | .... | .... | .... | .... | .... | 1:8 |
| Merphenyl borate (1:500) | 100+ | **38+** / 8 | 2 / 16 | .... | .... | .... | .... | 1:16 |
| **Chlorine solutions** | | | | | | | | |
| Zonite diluted 1:2 (1:190) | + | .... | .... | 100+ | 62+ / 14 | **0+** / 0 | .... | 1:4 |
| Apco no. 25 diluted 1:8.3 (1:260) | + | .... | .... | + | 88+ / 8 | **4+** / 14 | .... | 1:8 |
| **Miscellaneous solutions** | | | | | | | | |
| Hexylresorcinol (1:1,000) | + | 92+ / 8 | **2+** / 4 | .... | .... | .... | .... | 1:4 |
| Listerine (25 per cent alcohol) | + | 100+ | **16+** / 14 | .... | .... | .... | .... | 1:4 |
| Pepsodent (25 per cent alcohol) | + | 100+ | **24+** / 62 | .... | .... | .... | .... | 1:8 |

Numerator = percentage dead polymorphonuclear leukocytes; denominator = percentage secondarily killed leukocytes; boldface type = lowest dilution permitting 50 per cent survival; exponential signs = results of bactericidal tests; + = growth; 0 = no growth; * = first transfer showed no growth, second transfer growth.

The nontoxic intradermal doses are included in table 5. Those of the iodine and miscellaneous groups agree with their respective dilutions that were nontoxic for leukocytes, within the limits of error of both tests. The mercury solutions were much more toxic on intradermal injection than they were in the whole blood mixtures, whereas in the chlorine group the reverse was found to hold true. From these observations it would seem reasonable to conclude that the compounds resulting from the combination of body proteins with antiseptics of the iodine and miscellaneous groups are relatively innocuous, that those formed with mercury solutions are able to cause necrosis and that human polymorphonuclear leukocytes are particularly susceptible to antiseptics belonging to the chlorine group.

## COST

A list of the antiseptic solutions was sent to two reputable retail pharmacists with the request that they furnish the retail price of the different solutions, based on a unit volume of 8 ounces (240 cc.). In the case of proprietary antiseptics which were not marketed in this size bottle, it was asked that the price of a bottle nearest 8 ounces be given, together with the volume of its contents. In one instance in which the product had not been nationally marketed, the retail price was obtained from the manufacturer.

TABLE 6.—*Cost*

| Antiseptic Solutions | Size | Retail Price: Pharmacy A | Retail Price: Pharmacy B | Retail Price: Manufacturer | Average Unit (8 Oz.) Price |
|---|---|---|---|---|---|
| **Iodine solutions** | | | | | |
| Compound solution of iodine, U. S. P. (1:20) | 8 oz. | $1.25 | $1.50 | .... | $1.38 |
| Iodine solution, Amend (1:128)..... | 8 oz. | .... | .... | ? | ? |
| Compound solution of iodine diluted 1:6.4 (1:128) | 8 oz. undil. | 1.25 | 1.50 | .... | 0.21 |
| Compound solution of iodine diluted 1:27.8 (1:555) | 8 oz. undil. | 1.25 | 1.50 | .... | 0.05 |
| **Mercury solutions** | | | | | |
| Metaphen (1:500) ..... | 4 oz. | 1.35 | 1.35 | .... | 2.70 |
| Merthiolate (1:1,000) ..... | 4 oz. | 1.00 | 0.75 | .... | 1.75 |
| Mercurochrome (1:50) ..... | 8 oz. | 1.25 | 2.25 | .... | 1.75 |
| Mercuric oxycyanide (1:4,000)*..... | 8 oz. | 0.50 | 0.75 | .... | 0.63 |
| Mercury bichloride, V-A (1:1,000)*... | 8 oz. | 0.75 | 0.75 | .... | 0.75 |
| Merphenyl nitrate (1:1,500)..... | 16 oz. | .... | .... | 1.63 | 0.82 |
| Merphenyl borate (1:500)..... | 16 oz. | .... | .... | ? | ? |
| **Chlorine solutions** | | | | | |
| Zonite diluted 1:2 (1:190)..... | 6 oz. undil. | 0.50 | 0.50 | .... | 0.33 |
| Apco No. 25 diluted 1:8.3 (1:260)..... | 6 oz. undil. | 0.50 | .... | .... | 0.06 |
| **Miscellaneous solutions** | | | | | |
| Hexylresorcinol (1:1,000) ..... | 12 oz. | 1.00 | 1.00 | .... | 0.67 |
| Listerine (25 per cent alcohol)..... | 7 oz. | 0.50 | 0.45 | .... | 0.51 |
| Pepsodent (25 per cent alcohol).. | 7 oz. | 0.50 | 0.40 | .... | 0.46 |

* Indicates on prescription only.

The unit costs, listed in table 6, were obtained by averaging the costs from the two lists. Where dilution was necessary, no extra expense was added. In general, the unit prices of the mercury solutions were the highest and the miscellaneous solutions were next. The chlorine solutions and the iodine dilutions were by far the least expensive. While it is realized that these costs do not represent those of a hospital or even of the physician, they do give some idea of the relative expense to the patient.

## COMMENT

The tests here reported were selected or devised with the purpose of measuring certain prerequisites that seemed to be desirable in antiseptics used in wounds, on cuts and abrasions and for irrigations. As the methods differ from the majority of those used by other investigators, no attempt will be made to correlate the results in detail.

In brief, it may be said that the bactericidal potencies are much lower than those previously reported. This is partly explained for all solutions by the choice of the highest dilution killing in five minutes as the bactericidal limit, rather than that killing in ten minutes but not in five minutes. The potency of the mercury solutions was reduced even further by eliminating the bacteriostatic effect more effectively than has been done before in the majority of instances. Similarly, the potencies in the presence of serum are lower, as a result not only of the foregoing but also of the use of 50 per cent serum in the mixtures. No reference has been found in which diffusibility and toxicity have been determined by the methods used in this paper. Salle and Lazarus [3] have recently compared several antiseptics with regard to toxicity for chick embryo tissue cultures and to bactericidal activity against Staphylococcus aureus, but such comparison does not appear valid, in that the antiseptics were in contact with the tissue cultures for forty-eight hours and with the cocci for ten minutes, and in that the solutions used to determine bacteria killing power were not serum mixtures.

The method used to estimate penetration is far from ideal. One is concerned with the penetration of animal membranes, but the standardization of such membranes seemed to be unpractical. The factors governing penetration of cell membranes are much more complex than those concerned in diffusion through collodion membranes. With the latter, as shown in the tests, the diffusion rate is more rapid in solutions of simple inorganic compounds of relatively small molecular size. From analogy and with certain qualifications the same probably holds true for the penetration of animal membranes, although no experimental proof has been given.

When one considers this group of experiments as a whole, the superiority of iodine as an in vitro antiseptic is obvious. The bactericidal strength of any iodine solution is directly proportional to its free iodine content. It is the only antiseptic of the series that is potent in the presence of an equal amount of serum. It is diffusible and is not unduly toxic for human leukocytes. In dilutions that are suitable for their particular purposes it is inexpensive. In other words, solutions of iodine possess the prerequisites that were considered desirable for an antiseptic solution to be used in wounds, on cuts and abrasions and for irrigations.

A certain antipathy has arisen to iodine because of the fact that it is usually employed as the standard (7 per cent) or half strength (3.5 per cent) tincture. Such a solution is painful to apply and irritating, owing partly to the high iodine content and partly to the alcohol. The use of aqueous iodine solutions has been recommended but has not been generally accepted. By referring to the tables, it will be seen that even a 1:6.4 dilution of compound solution of iodine, U. S. P., is much more active in vitro than any of the other types of antiseptic solutions. This suggests that a 1 per cent or even a 0.5 per cent aqueous solution, containing the necessary amount of potassium or sodium iodide for solution, can be used to advantage in wounds and

3. Salle, A. J., and Lazarus, A. S.: Comparison of Resistance of Bacteria and Embryonic Tissue to Germicidal Substances, Proc. Soc. Exper. Biol. & Med. **32**: 665 (Feb.), 937 (March), 1057, 1119 (April) and 1481 (June) 1935.

on cuts and abrasions. Furthermore, it seems likely that even a 0.1 per cent aqueous solution (1:50 dilution of compound solution of iodine, U. S. P.) would be excellent for irrigations. In the latter case the development of iodism in the patient would have to be considered; but, if it is assumed that the iodine is absorbed as sodium iodide and that the potassium or sodium iodide is absorbed as such, only a little over 3 Gm. (45 grains) is contained in each liter and the absorption of more than a small percentage of the total is extremely unlikely.

SUMMARY

On the basis of the results of a series of tests to determine the relative in vitro activity of certain nonproprietary and proprietary antiseptic solutions commonly used in wounds, on cuts and abrasions and for irrigations, it is concluded that an aqueous solution of iodine apparently possesses more of the desirable prerequisites for a solution of this sort than any of the other antiseptic solutions that were tested.

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# GONADOTROPIC HORMONE IN THE BLOOD AND URINE OF EARLY PREGNANCY

## THE NORMAL OCCURRENCE OF TRANSIENT EXTREMELY HIGH LEVELS

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It is a surprising fact that there are relatively few quantitative estimations[1] of the gonadotropic hormone in the urine of normal pregnancy, attention having been directed mainly to the remarkable diagnostic reliability of the Aschheim-Zondek test. It is, however, well established that abnormally high levels of the hormone are found in the blood, urine and cerebrospinal fluid in hydatidiform mole and chorionepithelioma. Emphasis has therefore been placed on the need for quantitative hormone estimations in all cases suggesting either of these two types of pathologic alteration of pregnancy.[2]

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1. From the work of Zondek and others it is generally understood that normal pregnancy is characterized by urinary hormone levels of a few thousand mouse units per liter, levels which are attained in the "first weeks" of pregnancy and are maintained until near its end. Zondek has given a normal range of from 5,000 to 30,000 mouse units. Three erroneous schematic figures constitute the only charts known to us. These are the much copied figure of Zondek (Zondek, Bernhard: Hormone des Ovariums und des Hypohysenvorderlappens, ed. 2, Vienna, Julius Springer, 1935, p. 358, fig. 140), the figure of Frank (Frank, R. T.: Sex-Endocrine Factors in Blood and Urine in Health and Disease, J. A. M. A. **104**: 1991 [June 1] 1935, chart 5) and the figure of Mazer and Goldstein (Mazer, Charles, and Goldstein, Leopold: Clinical Endocrinology of the Female, Philadelphia, W. B. Saunders Company, 1932, reproduced in a report of the Council on Pharmacy and Chemistry: Estrogenic Substances: Theelin, J. A. M. A. **100**: 1331 [April 29] 1933). Graphs for individual cases have not appeared in the literature. The peculiar "peak" herein reported by us has perhaps been adumbrated by Zondek's declaration that an "explosion-like" secretion of the hormone occurs early in pregnancy but much more clearly by certain individual observations: namely, F. Laquer, 300,000 rat units per liter (Laquer, F.: Medizin und Chemie, I. G. Farbenindustrie **2**: 117, 1924); Aschheim, 100,000 mouse units per liter (Aschheim[3]); Ehrhardt, 70,000 mouse units per liter (Ehrhardt, C.: Quantitative Untersuchungen über die Ausscheidung von Hypophysenvorderlappenhormone im Harn, Klin. Wchnschr. **15**: 514 [April 11] 1936; and finally by the excellent explicit report of a case by Browne and Venning (Browne, J. S. L., and Venning, E. M.: The Assay of Urinary Oestrin and Gonadotropic Substances During Pregnancy, Am. J. Physiol. **116**: 18 [June] 1936).

2. Zondek, for instance, states that suspicion of the pathologic alteration of pregnancy may justifiably occur if the morning urine contains more than 50,000 mouse units per liter of the hormone (Zondek,[1] p. 367). Aschheim declares: "Values of more than 100,000 mouse units per liter point to the presence of hydatid mole with great probability" (Aschheim, Selmar: Pregnancy Tests, J. A. M. A. **104**: 1324 [April 13] 1935).

In the present communication we propose to report what we believe to be the invariable occurrence of the early-peak phenomenon as regards the gonadotropic content of blood and urine in all normal human pregnancies—a transient and remarkable rise in gonadotropic hormone followed by a fall to values of a few thousand units per liter. This transient hormone concentration at its extreme height equals or exceeds that reported in the aforementioned disorders, one of our cases showing a daily hormone output of 1,040,000 rat units. The lowest peak encountered by us in the six cases in which titrations were done when the hormone was at its maximum value indicated a daily output of 75,000 units—well over twice that recognized by Zondek as "normal."

TABLE 1.—*Weights and Characteristics of Ovaries in Rats Injected with Various Dilutions of Urine from Case 6 at the Peak of Hormone Secretion, 750,000 Rat Units per Day*

| Daily Dose Calculated as Fresh Urine, Cc. | Actual Weights of Both Ovaries, Mg. | Average Weights, Mg. | Description |
|---|---|---|---|
| 1.0 | 76 | 75 | Corpora lutea |
| | 56 | | Corpora lutea |
| | 92 | | Corpora lutea |
| 0.1 | 69 | 53 | Corpora lutea |
| | 37 | | Corpora lutea |
| | 52 | | Corpora lutea |
| 0.02 | 34 | 32 | Corpora lutea |
| | 24 | | Corpora lutea |
| | 37 | | Corpora lutea |
| 0.01 | 25 | 33 | Corpora lutea |
| | 40 | | Corpora lutea |
| | 34 | | Corpora lutea |
| 0.005 | 34 | 32 | Corpora lutea |
| | 34 | | Corpora lutea |
| | 27 | | Corpora lutea |
| 0.002 | 21 | 22 | Small and medium follicles |
| | 25 | | Corpora lutea |
| | 21 | | Small and medium follicles |
| 0.001 | 23 | 20 | Small and medium follicles |
| | 16 | | Small and medium follicles |
| | 22 | | Small and medium follicles |

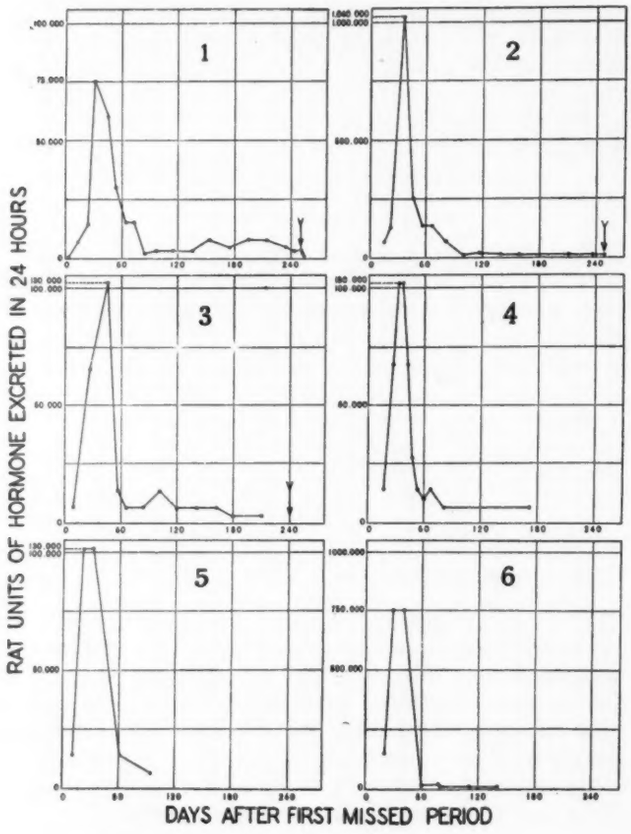
## METHODS

The chief cause for ignorance of hormone levels in normal pregnancies is undoubtedly the excessive cost of sufficiently accurate titrations. As regards the urine, we have insisted on a complete twenty-four hour collection as the only reliable sample. We feel that urine is preferably not handled with a preservative and should not be retained for many days or weeks even at a low temperature. Ideal technic involves the simultaneous administration of many dose levels of the fresh, diluted or undiluted urine to a large total group of animals. In all instances three animals were employed by us for each particular dose level and a range of levels (from four to eight) was administered. The animals were in all cases of known age (from 22 to 27 days) and whenever possible littermates were distributed to each dose group. If the test animals come from a single colony or genetic strain, we have found it extremely helpful to make weighings of the ovaries, since these data check nicely the qualitative data as to the presence or absence of one or more corpora lutea in either ovary of one member of a group. Killing of the animals occurs ninety-six hours after the first of the three daily injections. The best example of our procedure is furnished by an actual example of the records secured in a typical case (table 1).

## RESULTS

From the time of its first appearance, the increase in the concentration of gonadotropic hormone in the urine is spectacularly rapid, until a peak is reached some time

between the twentieth and the fiftieth day, usually about the thirtieth day, shown in table 2 and in the accompanying charts. The amount of hormone excreted at the peak seems to differentiate our cases into two groups: one in which total unitage per day is perhaps between 75,000 and 150,000 rat units, and another group in which it is between 750,000 and 1,000,000 units.




Concentration of gonadotropic principle in six cases.

Equally remarkable is the abrupt decrease in the concentration of gonadotropic hormone after the maximum has been reached. In all but one case the hormone concentration is below 10,000 rat units per liter by the sixty-fifth day and continues at or below this level until the termination of pregnancy. The amount of hormone excreted per day is therefore low during the last two thirds of pregnancy as compared with that involved in the ascent, summit and descent from the peak, all of which occur in the first two months. It is undoubtedly due to their transient presence and to the lack of sufficiently careful titrations that the regular occurrence of these high urinary hormone values has been previously overlooked.

It is unnecessary to comment on the speed with which the body frees itself of gonadotropic hormone following parturition because this fact is already well established. By the fifth day following parturition there is no trace of the hormone in the urine.

It is highly interesting that the urinary "peak phenomenon" herein reported is paralleled by the hormone levels of the blood. In case 5 on the thirty-seventh day the blood serum contained 100,000 rat units per liter of hormone and the urine exactly the same titer. In case 6 on the fortieth day the blood serum contained 500,000 units per liter of hormone with an identical level in the urine.

That the early normal tremendous rise in the hormone content of urine and blood is not an indication of toxicosis [3] is shown by the fact that in the two cases which exhibited the phenomenally high concentrations there was practically no indication of the minor disturbances commonly occurring in the early part of pregnancy, while patients with lower concentrations experienced these minor disturbances, such as varying degrees of nausea and discomfort during the early months of gestation. There is even a suggestion here that a higher hormone level is protective.

The great difference in hormone concentration between the two groups cannot be accounted for on the basis of the sex of the fetus, for patient 1 with a maximum daily excretion of 75,000 rat units, patient 2 with over 1,000,000 rat units and patient 3 with 100,000 rat units all gave birth to females. Since patients 1, 3 and 6 were multiparas while patients 2, 4 and 5 were primiparas, it is obvious that the factor of previous pregnancies is not involved. Since the cause of the normal hormone peak is obscure, it is obvious that conclusions can hardly be hazarded as to the cause of the striking variation in the height of the peak.

TABLE 2.—*Gonadotropic Hormone (Rat Units) Excreted in Twenty-Four Hours*

| Days After First Missed Period | Case 1 | Case 2 | Case 3 | Case 4 | Case 5 | Case 6 |
|---|---|---|---|---|---|---|
| 3 | 150 | ..... | ..... | ..... | ..... | ..... |
| 10 | ..... | ..... | 6,500 | ..... | 13,000 | ..... |
| 13 | 7,500 | ..... | ..... | ..... | ..... | ..... |
| 14 | ..... | 65,000 | ..... | ..... | ..... | ..... |
| 17 | ..... | ..... | ..... | 13,000 | ..... | ..... |
| 20 | ..... | ..... | ..... | ..... | 130,000 | 150,000 |
| 22 | 15,000 | 125,000 | ..... | ..... | ..... | ..... |
| 26 | ..... | ..... | 65,000 | 65,000 | ..... | ..... |
| 30 | 75,000 | ..... | ..... | ..... | 130,000 | 750,000 |
| 32 | ..... | ..... | ..... | 130,000 | ..... | ..... |
| 36 | ..... | 1,040,000 | 65,000 | 130,000 | ..... | ..... |
| 40 | ..... | ..... | ..... | 65,000 | ..... | 750,000 |
| 46 | 60,000 | 260,000 | 130,000 | 26,000 | ..... | ..... |
| 53 | 30,000 | ..... | ..... | 13,000 | ..... | ..... |
| 56 | ..... | 130,000 | 13,000 | ..... | ..... | ..... |
| 60 | ..... | ..... | ..... | 10,400 | 13,000 | 15,000 |
| 64 | 15,000 | ..... | ..... | ..... | ..... | ..... |
| 66 | ..... | 130,000 | 6,500 | 13,000 | ..... | ..... |
| 74 | 15,000 | ..... | ..... | ..... | ..... | ..... |
| 80 | ..... | 65,000 | ..... | 6,500 | ..... | 7,500 |
| 84 | 1,500 | ..... | 6,500 | ..... | ..... | ..... |
| 90 | ..... | ..... | ..... | ..... | ..... | ..... |
| 96 | 3,000 | ..... | ..... | ..... | 6,500 | ..... |
| 99 | ..... | 10,400 | 13,000 | ..... | ..... | ..... |
| 111 | ..... | ..... | ..... | ..... | ..... | 7,500 |
| 114 | 3,000 | ..... | ..... | ..... | ..... | ..... |
| 118 | ..... | 13,000 | ..... | ..... | ..... | ..... |
| 120 | ..... | ..... | 6,500 | ..... | ..... | ..... |
| 140 | 3,000 | 6,500 | 6,500 | ..... | ..... | 7,500 |
| 150 | 7,500 | ..... | ..... | ..... | ..... | ..... |
| 158 | ..... | 6,500 | ..... | ..... | ..... | ..... |
| 163 | ..... | ..... | 6,500 | ..... | ..... | ..... |
| 174 | 4,500 | ..... | ..... | 6,500 | ..... | ..... |
| 180 | ..... | ..... | 2,600 | ..... | ..... | ..... |
| 194 | 7,500 | ..... | ..... | ..... | ..... | ..... |
| 210 | 7,500 | 6,500 | 2,600 | ..... | ..... | ..... |
| 236 | 4,500 | 6,500 | ..... | ..... | ..... | ..... |
| 240 | ..... | ..... | ——— | ..... | ..... | ..... |
| 244 | 3,000 | ..... | ..... | ..... | ..... | ..... |
| 247 | ..... | ——— | ..... | ..... | ..... | ..... |
| 250 | 3,000 | ..... | ..... | ..... | ..... | ..... |
| **Postpartum** | | | | | | |
| 1 | 1,500 | ..... | ..... | ..... | ..... | ..... |
| 2 | 300 | ..... | ..... | ..... | ..... | ..... |
| 3 | 120 | ..... | ..... | ..... | ..... | ..... |
| 4 | 0 | ..... | ..... | ..... | ..... | ..... |

3. Ehrhardt [1] is unaware of the "peak phenomenon" but familiar with occasional surprisingly high levels of urinary hormone in normal early pregnancy. He reports, for instance, encountering a normal case of 70,000 mouse units per liter between the first and the second month. Although he therefore speaks guardedly, he has associated pernicious vomiting in the first to the third month with "high" hormone content of the urine, which his figures show to have varied from 20,000 to 190,000 units in his cases.

CONCLUSIONS

1. Charts are presented showing the actual quantitative content of the urine in gonadotropic hormone at various times throughout six normal pregnancies.

2. The charts show the invariable existence of an exceedingly steep and high hormone peak at a time which is quite accurately one month from the beginning of the first expected but missed menstruation.

3. The peak must be recognized as a normal phenomenon in all studies attempting to relate high hormone levels with pathologic insignia.

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# SEROLOGIC DIAGNOSIS OF INFECTIOUS MONONUCLEOSIS

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Infectious mononucleosis has been known under different names since 1889, when it was described by E. Pfeiffer [1] as glandular fever. Thirty-four years later, Tidy and Daniel [2] and Downey and McKinlay [3] described the characteristic blood changes and inaugurated the hematologic diagnosis of infectious mononucleosis. The blood changes are very helpful in the recognition of the disease, but they are not pathognomonic. Similar changes are found in several clinically unrelated diseases, particularly acute infections of the pharynx. Furthermore, in the early stages of infectious mononucleosis the characteristic elevation of the mononuclear cells may be absent and the blood picture may show merely a slight to moderate increase of the total number of white cells with a normal differential count.

A second phase in the diagnosis of infectious mononucleosis was initiated in 1932 by Paul and Bunnell,[4] when they found that the blood serum of the patients is able, even in high dilutions, to clump sheep red cells.

It has been known for a long time that the blood serum of a large majority of persons is able to lake and to clump the erythrocytes of the sheep, but only in very low dilutions.[5] It has also been known that the lytic and agglutinative power of human blood serum rises considerably after the injection of horse serum, normal or immune, particularly if followed by serum disease.[6] It was in the course of checking my observations in horse serum disease that Paul and Bunnell discovered the presence of similar antibodies in infectious mononucleosis.

The hemolysins and agglutinins of normal persons and of persons injected with horse serum are called heterophilic antibodies. The term "heterophilic" refers to the property of such antibodies to react with an antigen (sheep erythrocytes) that seemingly had nothing to do with their development. They possess that property in addition to the ability to react with the homologous antigen. Some heterophilic antibodies are specifically removed from human or animal serum by the tissues of various animals (guinea-pig, horse, chicken and others) and by some bacteria (pneumococci, dysentery bacilli and others). The antigen in these animals and bacteria is known under the name of its discoverer as the Forssman heterophilic antigen. It is well to remember that there are varieties of heterophilic antigens and antibodies that differ from the Forssman type. Further information may be found in reviews of the subject.[7]

It was shown by proper absorption tests that the antibodies against sheep red cells in normal persons and after horse serum therapy are of the Forssman type and by analogy it was assumed by many writers that the antibodies in infectious mononucleosis are also of that type.

In February 1934 I presented before the Chicago Pathological Society a modification of the technic of the agglutination test for infectious mononucleosis that has greater speed and precision than the older technic that I employed previously in the study of serum disease.[8] I now began a study of the nature of the heterophilic antibodies in infectious mononucleosis and a preliminary report of my studies was given at the meeting of the American Society of Clinical Pathologists in June 1935.[9] It is of interest that similar investigations were carried on independently of each other by C. A. Stuart and his associates,[10] and by Bailey and Raffel.[11]

In view of the fact that nothing definite is known at present about the etiology of infectious mononucleosis and that the morphologic changes in the blood are characteristic but not absolutely specific for the disease, the study of the antibodies in the blood serum offers a basis for recognition as well as for classification of the disease. It may be that the finding of the etiologic factor will modify or even nullify the significance of the serologic changes in infectious mononucleosis. It may then become apparent that we are dealing here with more than one disease. However, until such time, considerable help can be derived from what is already known about the heterophilic antibodies in mononucleosis.

The purpose of my report is to demonstrate the value of the agglutination test in the diagnosis of atypical cases of infectious mononucleosis and to present a differential test for infectious mononucleosis which widens greatly the usefulness of the serologic diagnosis. The hematologic aspect of the diagnosis of infectious mononucleosis will not be discussed, because nothing can be

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Read before the Section on Pathology and Physiology at the Eighty-Seventh Annual Session of the American Medical Association, Kansas City, Mo., May 13, 1936.

1. Pfeiffer, E.: Das Druesenfieber, Jahrb. f. Kinderh. **29**: 257-264, 1889.

2. Tidy, H. L., and Daniel, E. C.: Glandular Fever and Infectious Mononucleosis, with an Account of an Epidemic, Lancet **2**: 205 (July 7) 1923.

3. Downey, Hal, and McKinlay, C. A.: Acute Lymphadenosis Compared with Acute Lymphatic Leukemia, Arch. Int. Med. **32**: 82-112 (July) 1923.

4. Paul, J. R., and Bunnell, W. W.: Presence of Heterophilic Antibodies in Infectious Mononucleosis, Am. J. M. Sc. **183**: 90-104 (Jan.) 1932.

5. Davidsohn, Israel: Heterophilic Antibodies in Serum Disease: Third Report, J. Infect. Dis. **53**: 219-229 (Sept.-Oct.) 1933.

6. Davidsohn, Israel: (*a*) Heterophile Antibodies in Serum Sickness, J. Immunol. **16**: 259-273 (March) 1929; (*b*) Further Studies on Heterophilic Antibodies in Serum Sickness, ibid. **18**: 31-49 (Jan.) 1930; (*c*) footnote 5.

7. Davidsohn, Israel: Heterophile Antigens and Antibodies, Arch. Path. & Lab. Med. **4**: 776-806 (Nov.) 1927. Buchbinder, Leon: Heterophile Phenomena in Immunology, Arch. Path. **19**: 841-880 (June) 1935.

8. Davidsohn (footnote 6 *a* and 6 *b*).

9. Davidsohn, Israel, and Walker, P. H.: The Nature of the Heterophilic Antibodies in Infectious Mononucleosis: I, Am. J. Clin. Path. **5**: 455-465. (Nov.) 1935.

10. (*a*) Stuart, C. A.; Burgess, A. M.; Lawson, E. A., and Wellman, H. E.: Some Cytologic and Serologic Aspects of Infectious Mononucleosis, Arch. Int. Med. **54**: 199-214 (Aug.) 1934. (*b*) Stuart, C. A.: Heterophile Antibodies in Infectious Mononucleosis, Proc. Soc. Exper. Biol. & Med. **32**: 861-863 (March) 1935. (*c*) Stuart, C. A.; Griffin, A. M.; Fulton, MacDonald, and Anderson, E. G. E.: Nature of the Antibodies for Sheep Cells in Infectious Mononucleosis, ibid. **34**: 209-212 (March) 1936. (*d*) Stuart, C. A.; Griffin, A. M.; Wheeler, K. M., and Batey, Shirley: A Thermostable Antigen in Beef Cells, ibid. **34**: 212-215 (March) 1936.

11. Bailey, G. H., and Raffel, Sidney: Hemolytic Antibodies for Sheep and Ox Erythrocytes in Infectious Mononucleosis, J. Clin. Investigation **14**: 228-244 (March) 1935.

added to the excellent contributions of Downey and McKinlay [3] and Downey and Stasney.[12]

The report is based on a serologic study of thirty cases of infectious mononucleosis, of seventeen cases of serum disease, of a group of borderline cases which were indistinguishable from infectious mononucleosis clinically and hematologically, and of a series of normal controls with a negative history as to infectious mononucleosis and horse serum injection.

### ABSORPTION

The serum is heated for thirty minutes at 56 C. Portions of the serum are absorbed with the following antigens: kidney of the guinea-pig and of the rabbit, beef heart, sheep erythrocytes, beef erythrocytes, and kaolin. The kidneys are kept frozen in the refrigerator until needed. They are then thawed and washed repeatedly in physiologic solution of sodium chloride until the washings are free from blood. They are now mashed into a fine pulp and used for absorption as a 20 per cent suspension in physiologic solution of sodium chloride. The suspensions are boiled for one hour on the water bath, and the loss by evaporation is made up with distilled water.

TABLE 1.—*Technic of Test for Infectious Mononucleosis*

| Tubes | Saline Solution, Cc. | Serum, Cc. | Serum Dilutions | 2 per Cent Sheep Cells, Cc. | Final Dilutions of Serum | Shake tubes well; keep at room temperature for 2 hours and read | Titers in This Series: No. of Cases | Titers in This Series: Per Cent |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.4 | 0.1 | 1:5 | 0.1 | 1:7 | | | |
| 2 | 0.25 | 0.25 of 1:5 | 1:10 | 0.1 | 1:14 | | | |
| 3 | 0.25 | 0.25 of 1:10 | 1:20 | 0.1 | 1:28 | | | |
| 4 | 0.25 | 0.25 of 1:20 | 1:40 | 0.1 | 1:56 | | 1 | 3.5 |
| 5 | 0.25 | 0.25 of 1:40 | 1:80 | 0.1 | 1:112 | | 2 | 6.5 |
| 6 | 0.25 | 0.25 of 1:80 | 1:160 | 0.1 | 1:224 | | 2 | 6.5 |
| 7 | 0.25 | 0.25 of 1:160 | 1:320 | 0.1 | 1:448 | | 8 | 27.0 |
| 8 | 0.25 | 0.25 of 1:320 | 1:640 | 0.1 | 1:896 | | 8 | 27.0 |
| 9 | 0.25 | 0.25 of 1:640 | 1:1,280 | 0.1 | 1:1,792 | | 4 | 13.0 |
| 10 | 0.25 | 0.25 of 1:1,280 | 1:2,560 | 0.1 | 1:3,584 | | 2 | 6.5 |
| 11 | 0.25 | 0.25 of 1:2,560 | 1:5,120 | 0.1 | 1:7,168 | | 3 | 10.0 |
| 12 | 0.25 | 0.25 of 1:5,120 | 1:10,240* | 0.1 | 1:14,336 | | | |
| Control 13 | 0.25 | ..... | ..... | 0.1 | | | | |
| Total | | | | | | | 30 | 100.0 |

* Discard 0.25 cc. from last tube.

For the beef heart suspension the product of the Digestive Ferment Company is used. The suspension is not boiled.

The sheep and beef red cells are washed three times, packed well in the centrifuge, suspended in four volumes of physiologic solution of sodium chloride and boiled for one hour on the water bath. The loss by evaporation is made up with distilled water. The kaolin is also used as a 20 per cent suspension in physiologic solution of sodium chloride. This suspension is not boiled. Enough phenol is added to all antigenic suspensions to make a 0.5 per cent solution. The antigens may be kept in the icebox for many months without a noticeable change.

For absorption, different quantities of the antigens are added to the serum; the mixtures are kept at room temperature for one hour and shaken vigorously at intervals of fifteen minutes. They are then centrifugated and the clear supernatant serum is transferred to other test tubes.

Two series of absorptions were carried out with different technics. In one series the serum was absorbed with the varying amounts of the antigens (from 0.03 to 0.12 cc. to 0.1 cc. of serum). After the absorption a quantity of the serum sufficient for the various titrations was removed and a second absorption carried out by treating the remainder of the serum with an equal amount of the suspension of the antigen. Again, enough serum was removed to study the effect of the second absorption. The third and further absorptions were then carried out. The effect of the repeated absorptions on the dilution of the serum was taken into consideration. This repeated absorption supplied the quantitative data concerning the relation between the absorbing antigen and the absorbed antibody.

In the second series of absorptions, the serum (in quantities of 0.1 cc.) was treated only once with varying amounts of antigens.

### TITRATION

Dilutions of the untreated and of the absorbed serum ranging from 1:5 to 1:5,120 or more are set up. The total quantity of the dilution is 0.25 cc.; 0.1 cc. of a 2 per cent suspension of washed sheep cells is added. The tubes are left at room temperature for two hours. The tubes are shaken vigorously until the sediment of the cells becomes suspended. The reading is done with the low power of the microscope (32 mm. objective). The titers as they are recorded represent the so-called one plus reading and signify distinct microscopically discernible clumping. A difference of about one dilution may result when the reading is done with the naked eye. The titers are estimated in the terms of the final dilutions (see table 1 in a previous publication [9]).

Table 1 brings out the details of the test for infectious mononucleosis. The last columns list the incidence of titers in my series.

### THE RESULTS OF THE ABSORPTION STUDIES

Serum from normal persons, from patients with serum disease, and with infectious mononucleosis was absorbed with different antigens. The titers of the sheep agglutinins were determined before and after the absorptions. The effect of the absorption was expressed in the percentages of the antibodies that were removed.

As stated, agglutinins for sheep erythrocytes are found in low titers in the blood serum of most normal persons. In a previous series [5] they were below the lowest titer of 1:3.5 in only 7 per cent of 217 normal persons, and in only 1 per cent of them was the titer 1:56, while the remainder had titers varying from 1:3.5 to 1:28.

The titers of the serums of five normal persons varied from 1:14 to 1:28, the average titer being 1:20. The kidney of the guinea-pig and the erythrocytes of the sheep, both carriers of the Forssman antigen, removed completely the agglutinins for the sheep red cells. The kidney of the rabbit and the erythrocytes of the beef absorbed on the average 35 per cent of the agglutinins. The results are in accord with the well known fact that the agglutinins for sheep erythrocytes in normal persons are of the Forssman heterophilic type. The inability of beef erythrocytes to remove the heterophilic agglutinins is worthy of note, mainly in view of their different action in mononucleosis.

Four serums of patients with serum disease were absorbed with the antigens repeatedly until the agglutinins for sheep erythrocytes were completely removed, and three serums were absorbed only once with an ade-

12. McKinlay, C. A.; Downey, Hal, and Stasney, Joseph: Infectious Mononucleosis, J. Am. M. A. **105**: 761-768 (Sept.) 1935.

quate quantity of the antigen, which was found to be 0.1 cc. of the antigenic substance to 0.1 cc. of the undiluted serum.

All antigens had a marked tendency to absorb the agglutinins for sheep erythrocytes. However, the absorption by the kidney of the rabbit was noticeably less than that of the other antigens, particularly when smaller quantities of the antigen were used, while with larger quantities the nonspecific effect became more and more pronounced. The readiness with which the agglutinins were removed by beef erythrocytes was striking, particularly by comparison with the normal serum.

Serums of thirteen patients with infectious mononucleosis were absorbed repeatedly with the different antigens until maximum absorption was obtained. Serums of nine patients with mononucleosis were treated with the optimum quantities of antigens (0.05 and 0.1 cc. to 0.1 cc. of serum); 0.1 cc. of the beef cells and of beef heart removed promptly all agglutinins for sheep cells. Kaolin and kidney of the guinea-pig and of the rabbit removed between 50 to 75 per cent of the agglutinins. The average absorption was 50 per cent by kaolin, 61 per cent by the rabbit kidney, and 69 per cent by the guinea-pig kidney. Further absorptions did not remove any more of the antibody. The

TABLE 2.—*Comparison of the Effect of Absorption*

| | | Percentages of Absorption of Agglutinins for Erythrocytes of the Sheep with | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Averages of Titers Before Absorption | Erythrocytes of Beef, Cc. | | Erythrocytes of Sheep, Cc. | | Beef Heart, Cc. | | Kidney of Guinea-Pig, Cc. | | Kidney of Rabbit, Cc. | | Kaolin, Cc. | |
| | | 0.05 | 0.1 | 0.05 | 0.1 | 0.05 | 0.1 | 0.05 | 0.1 | 0.05 | 0.1 | 0.05 | 0.1 |
| Normal controls (five cases)..... | 20 | 35 | ... | 100 | .. | .. | ... | 100 | ... | 35 | .. | 0 | .. |
| Serum disease (three cases)... | 91 | ... | 97 | ... | .. | .. | 100 | ... | 100 | .. | 95 | .. | .. |
| Infectious mononucleosis (nine cases)..... | 342 | 100 | 100 | ... | .. | 99 | 100 | ... | 69 | .. | 61 | .. | 50 |

ability of the beef red cells to absorb the agglutinins for sheep cells from serums of patients with infectious mononucleosis was first reported by Bailey and Raffel [11] and was recently confirmed by Stuart and his associates.[10d] I observed the same phenomenon before the publication of their reports and have confirmed it since in every case of infectious mononucleosis. Beef heart tissue had the same effect as beef erythrocytes. However, in a few cases with very high titers, the beef heart removed the agglutinins for the sheep erythrocytes less efficiently than did the beef red cells.

Table 2 emphasizes the different behavior of the sheep agglutinins in the serum of normal persons and of persons with serum disease and with infectious mononucleosis with regard to the different antigens.

The failure of the guinea-pig kidney to remove the agglutinins for sheep erythrocytes from the serum of patients with infectious mononucleosis establishes that the heterophilic antibodies in that disease are not of the Forssman type. The readiness with which beef erythrocytes removed the antibodies in serum disease is contrasted with their failure to do it in normal serum. It is apparent that absorption with beef erythrocytes cannot be employed for the separation of infectious mononucleosis from serum disease but that absorption with guinea-pig kidney can clearly differentiate the two conditions. Removal of the agglutinins for the erythrocytes of sheep with beef erythrocytes and the failure of the guinea-pig kidney to remove them completely establishes the diagnosis of infectious mononucleosis, while removal of the sheep agglutinins with the guinea-pig kidney excludes mononucleosis. That the absorption of a serum with beef erythrocytes and of another sample of the same serum with the guinea-pig kidney offers a convenient method for the differential diagnosis of infectious mononucleosis will be illustrated by concrete examples.

## TECHNIC OF THE DIFFERENTIAL TEST FOR INFECTIOUS MONONUCLEOSIS

### ABSORPTION WITH BOILED BEEF ANTIGEN

Place in a test tube (85 by 16 mm.) 0.5 cc. of the thoroughly shaken 20 per cent suspension of boiled beef erythrocytes. Add 0.1 cc. of serum that has been heated for thirty minutes at 56 C. Shake and let stand at room temperature for one hour, shaking at fifteen minute intervals. Centrifugate at 1,500 revolutions for ten minutes. Remove the supernatant fluid with a capillary pipet. To a row of six tubes (75 by 12 mm.) add 0.25 cc. of physiologic solution of sodium chloride. To the first tube add 0.25 cc. of the absorbed serum. Mix and transfer 0.25 cc. to the second tube and so on. Discard 0.25 cc. from the last tube. The serum dilutions are 1:10, 1:20, 1:40 and so on. Add 0.1 cc. of a 2 per cent suspension of sheep cells. Shake well. Final dilutions of serum are 1:14, 1:28 and so on. Let stand at room temperature for two hours. Read.

### ABSORPTION WITH BOILED GUINEA-PIG KIDNEY

Exactly the same procedure as before, using 0.5 cc. of the thoroughly shaken 20 per cent suspension. If it is necessary to begin with a dilution of 1:7, as may be the case in serums with titers below 1:112 (see case 31), add 0.2 cc. of serum to 1 cc. of the antigen suspension. For titration omit the physiologic solution of sodium chloride from the first tube, but in the other tubes, place the usual amount of 0.25 cc. From the absorbed serum, add 0.25 cc. to the first and to the second tube. Proceed as before. The final dilutions are 1:7, 1:14 and so on.

## THE DIAGNOSTIC PROBLEMS IN INFECTIOUS MONONUCLEOSIS

It is stated frequently that infectious mononucleosis can be easily diagnosed from the results of the clinical and hematologic examinations. That is undoubtedly true in the majority of cases. However, my experience has taught me that not infrequently cases are encountered that present great diagnostic difficulties. The histories of the thirty cases that form the basis of this report confirm fully the opinions of those authors who emphasize the great variety of the manifestations of mononucleosis. Bernstein [13] enumerates twenty-nine conditions that may simulate mononucleosis. Among them he did not mention chronic lymphatic leukemia and monocytic leukemia, both of which may have to be differentiated from mononucleosis. He also failed to include eight conditions from which mononucleosis may have to be separated, as was the case in our series: acute appendicitis (case 1 [14]), acute surgical conditions of the abdomen (other than appendicitis) (case 6), acute leukemia (cases 6 and 12), acute gastritis and hepatitis (case 12), agranulocytosis (case 2), acute meningitis and encephalitis (case 27).

I shall confine myself to a brief presentation of a few reports that will illustrate the value of the agglutination test and of the differential test for infectious mononucleosis.

The diagnostic difficulties in mononucleosis can be divided into five groups. To the first group belong the

13. Bernstein, Alan: Antibody Responses in Infectious Mononucleosis, J. Clin. Investigation **13**: 419-435 (May) 1934.

14. Davidsohn, Israel: Infectious Mononucleosis, Am. J. Dis. Child. **49**: 1222-1231 (May) 1935.

patients with an atypical, frequently very severe and alarming course and with rare complications. Here belong also the patients who do not show the usual increase in the numbers of the mononuclear cells in the early stages of the disease.

CASE 2.—*Infectious mononucleosis resembling agranulocytosis.* A college student, aged 18 years, had been taking for some time aminopyrine for menstrual pains and headaches. She was suddenly taken ill with chills, fever, swelling of the cervical lymph nodes and an ulcerative lesion of the pharynx. The white blood count was 1,500, with 15 per cent granulocytes. The diagnosis of agranulocytosis was made. It was then decided to carry out the agglutination test for heterophilic antibodies. It was strongly positive (1:896+). The diagnosis was changed to infectious mononucleosis. The patient recovered soon afterward. The leukopenia disappeared early; the white count on the fifth day was 9,300. The mononucleosis persisted for many weeks and showed from 60 to 80 per cent lymphocytes.

TABLE 3.—*The Differential Test in Cases of Infectious Mononucleosis with a Low Titer of Heterophilic Antibodies*

| | | | Percentage of Absorption of Agglutinins for the Erythrocytes of the Sheep with | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Erythrocytes of Beef, Cc. | | Beef Heart, Cc. | | Kidney of Guinea-Pig, Cc. | | Kidney of Rabbit, Cc. | | Kaolin, Cc. | |
| Case | Date | Titer Before Absorption | 0.05 | 0.1 | 0.05 | 0.1 | 0.05 | 0.1 | 0.05 | 0.1 | 0.05 | 0.1 |
| 31 | 4/ 1/36 | 56 | 100 | 100 | 100 | 100 | 50 | 75 | 75 | 75 | 50 | 50 |
| 7 | 3/20/35 | 896 | ... | 100 | ... | ... | .. | 50 | .. | 50 | .. | .. |
| 7 | 4/27/35 | 56 | ... | 100 | ... | ... | .. | 50 | .. | 50 | .. | .. |

CASE 6.—*Infectious mononucleosis with features of an acute abdominal condition and of an acute leukemia; absence of a mononucleosis in the first blood count.* A college student, aged 18 years, was admitted, complaining of severe abdominal pains, nausea, vomiting and fever. Six weeks before admission she had a skin eruption diagnosed as measles. The lymph nodes of the neck were slightly enlarged but not tender. The left upper part of the abdomen was extremely tender. Blood examination revealed 6,720 white blood cells, with 51 per cent neutrophilic and 3 per cent eosinophilic leukocytes and 46 per cent lymphocytes. On the following day the fever assumed a septic character. The percentage of mononuclear cells rose to 58. An acute abdominal condition was suspected. An exploratory operation was considered imminent if improvement should not take place in a few days. Six days later a marked change in the blood took place: the white cells rose to 12,600 and the mononuclear cells to 93 per cent; 8 per cent among them resembled lymphoblasts. That, together with the serious clinical condition, made it necessary to consider acute leukemia. However, the test for infectious mononucleosis was then found to be positive (1:224). The attending physician was thus able to give a favorable prognosis. The patient made a rapid and uneventful recovery and has been well since. Various laboratory tests were negative. They included blood cultures, blood chemistry, Wassermann and Kahn tests, coagulation and bleeding time, and agglutinations for typhoid, paratyphoid, dysentery and undulant fever. Repeated blood counts were carried out during the patient's illness (table 5). The mononucleosis persisted until her discharge. It varied from 80 to 93 per cent.

In this case the agglutination test established the diagnosis of infectious mononucleosis; without it the patient might have been subjected to an exploratory operation.

CASE 12.—*Infectious mononucleosis with an acute gastritis, hepatitis, jaundice, with a severe toxemia and acute heart failure.* A man, aged 37, was admitted complaining of gastric distress for about six weeks. He lost 6 pounds (2.7 Kg.) in the last two weeks. He had a history of rheumatic heart disease in the past. Moderate jaundice, slightly enlarged but not tender lymph nodes of the neck and axillae, and an enlarged spleen and liver were found. The heart was enlarged and the changes were those of a mitral endocarditis. There were 16,250 white cells with 84 per cent mononuclear cells and among them 8 young cells resembling lymphoblasts. The temperature kept on rising steadily, the pulse rate went up to 150 and the patient became very toxic. Pulmonary edema developed and the patient was considered critically ill. In addition to an acute endocarditis, acute leukemia, and infectious hepatitis were considered. At that time the high percentage of lymphocytes in the differential blood smear suggested the test for infectious mononucleosis. It was strongly positive (1:896). The result surprised all who attended the case and was accepted with a considerable measure of doubt. On the seventh day a dramatic turn for the better took place, with a sudden drop of the temperature. The jaundice reached a maximum on the ninth hospital day (icterus index 42 with a biphasic van den Bergh reaction) and then declined gradually. The patient was discharged on the twenty-fourth day. He remained well. His blood was studied repeatedly after his discharge during a period of 296 days (table 5).

The acute heart failure in an individual with a damaged myocardium brought about by the severe toxemia was a striking feature of the case.

These three cases are of the type in which the diagnosis of infectious mononucleosis would have been very difficult without the serologic test; only the later course might have suggested it.

Another form of diagnostic difficulties is encountered in cases that are indistinguishable from infectious mononucleosis clinically as well as hematologically and can be separated from it only by means of the serologic test, as the following case history will illustrate:

*Lymphocytic angina with a low titer of heterophilic antibodies; test for infectious mononucleosis negative.* A boy, aged 8 years, was taken ill with a sore throat and fever. His cervical lymph nodes were markedly enlarged and tender. The blood smear on the fifth day of illness showed polymorphonuclear leukocytes 22 per cent, eosinophils 1 per cent, lymphocytes 69 per cent, abnormal lymphocytes 1 per cent and monocytes 7 per cent (77 per cent mononuclear cells). The blood picture was indistinguishable from that generally seen in infectious mononucleosis and the clinical appearance was like that of mononucleosis; however, the agglutination test for mononucleosis was negative (1:7+). The child recovered rapidly.

TABLE 4.—*The Changes in the Titers of the Heterophilic Antibodies and the Differential Blood Picture*

| Case | Mononuclear Cells, % | Abnormal Lymphocytes, % | Sheep Agglutinins + | Condition | Days Since Onset of Illness |
|---|---|---|---|---|---|
| 12 | 83.5 | 8.0 | 896 | ..... | 45 |
| | | | 1,792 | ..... | 48 |
| | 37 | 1.0 | 896 | ..... | 50 |
| | 65 | 5.0 | 448 | ..... | 52 |
| | 65 | 3.0 | ... | ..... | 54 |
| | 63 | 3.0 | ... | ..... | 57 |
| | 60 | 6.0 | 224 | ..... | 59 |
| | | | 112 | ..... | 62 |
| | 57 | 1.5 | ... | ..... | 65 |
| | 66 | 3.5 | 112 | Discharged improved | 68 |
| | 48 | ... | 56 | Improved | 92 |
| | | | 56 | ..... | 106 |
| | | | 56 | Improved | 117 |
| | 43.5 | 0.5 | 14 | Well | 296 |
| 17 | 60 | 5.0 | 448 | ..... | 13 |
| | 70 | 4.0 | 448 | Discharged well | 16 |
| | 61 | 1.5 | 224 | Well | 23 |
| | | | 224 | Well | 30 |
| | 54 | ... | 56 | Well | 42 |
| | | | 28 | ..... | 57 |
| | | | 28 | ..... | 85 |
| | | | 14 | Well | 201 |

In this case the low titer of agglutinins for sheep cells made it easy to exclude infectious mononucleosis. The decision is difficult in the third group, in which the clinical and hematologic picture suggests infectious mononucleosis and the titer of agglutinins for sheep

cells is on the borderline (1:56 and 1:112). It is in these cases that the new differential test for infectious mononucleosis becomes invaluable. Mononucleosis is excluded if the absorption with the guinea-pig kidney removes the agglutinins for sheep cells. Bailey and Raffel [11] suggested the absorption with beef erythrocytes as sufficient for differentiation, claiming that removal of the agglutinins for the sheep cells establishes the diagnosis of infectious mononucleosis. The results of the absorption experiments as presented in the first part of the paper demonstrated that in serum disease the agglutinins for sheep erythrocytes are readily removed by boiled beef erythrocytes. A considerable number of absorptions of serum from patients without infectious mononucleosis showed the ability of beef erythrocytes to remove agglutinins for sheep erythrocytes. If the absorption with beef erythrocytes were the only criterion, erroneous conclusions would result. Such errors are prevented by absorbing the serum with the guinea-pig kidney and with beef erythrocytes. Two cases will serve as illustrations:

*Lymphocytic angina with high (borderline) titers of heterophilic antibodies.* A boy, aged 7 years, was admitted with a sore throat and markedly enlarged lymph nodes. The spleen was moderately enlarged. The tonsils were covered with a membrane. The temperature was 102.4 F. The child looked very ill. Smears from the throat showed large numbers of Vincent's organisms. Diphtheria bacilli were absent. Examination revealed 7,200 white blood cells with 57 per cent lymphocytes and 1 per cent of so-called abnormal lymphocytes. The titer of sheep agglutinins was 1:112, which is the so-called borderline titer. The differential test was negative for infectious mononucleosis. The infection in the pharynx dominated the picture during the further course. The infection extended into the ethmoid and maxillary sinuses. The spleen continued to be enlarged. Repeated blood counts showed normal numbers of white blood cells and from 50 to 61 mononuclear cells, with from 1 to 3 per cent of so-called abnormal lymphocytes. The child improved gradually and left the hospital three weeks after admission.

A girl, aged 3 years, took ill with a sore throat and fever. The lymph nodes, particularly those of the neck, were enlarged and tender, the spleen and liver were enlarged. The differential smear showed 21 per cent neutrophilic leukocytes, 72 per cent lymphocytes, 5 per cent abnormal lymphocytes and 2 per cent monocytes. The test for heterophilic antibodies was 1:56+. The differential test was negative for infectious mononucleosis.

In both preceding cases the absorption with ox cells removed completely the agglutinins for sheep cells. To class them on that basis as infectious mononucleosis would have been erroneous, as was demonstrated in the differential test by the complete removal of the sheep agglutinins by the guinea-pig kidney.

Such cases, which are clinically and hematologically indistinguishable from infectious mononucleosis and are serologically negative as established by the agglutination test or by the differential test, are not infrequent. As I stated in my discussion of the paper of Downey and McKinlay,[12] there is a need for the separation of infectious mononucleosis as a serologically homogeneous group from the other group that is serologically negative. To avoid confusion it may be advisable to apply to the serologically negative group the old term "lymphocytic angina."

While in the foregoing cases with borderline titers the differential test helped to exclude infectious mononucleosis, in the fourth group of clinically and hematologically similar cases the differential test helps to establish the diagnosis of mononucleosis, as is illustrated by the following report:

CASE 31.—*Infectious mononucleosis with a low titer of heterophilic antibodies.* A man, aged 50, took ill in Florida in February 1936. He had enlarged inguinal and axillary lymph nodes, fever and general malaise. A blood count early in March showed 17,000 white cells with 80 per cent lymphocytes. A diagnosis of infectious mononucleosis was considered but was not made with certainty. The patient improved and returned to his home, where it was considered advisable to establish the nature of his illness in Florida. On March 31 he had 7,000 white cells with 49 per cent mononuclear cells. The titer of the heterophilic antibodies was 1:56+. That alone was not sufficient to diagnose mononucleosis. However, the differential test (as shown in table 3) permitted a definite diagnosis of infectious mononucleosis. Its result was a complete absorption of the sheep agglutinins with beef cells and only partial absorption with the guinea-pig kidney.

The service that was rendered by the differential test in the last case is supported by another absorption shown in table 3. In a typical case of infectious mononucleosis (case 7) the titer of heterophilic antibodies was at its height, 1:896+. Thirty-eight days later the titer was below the diagnostic level for mononucleosis, 1:56+. However, the differential test showed the same result that is characteristic for infectious mononucleosis as at the height of the titer.

Another case (34) was seen recently in a physician with a marked leukopenia. His condition was first diagnosed as agranulocytosis and only later did the test permit the diagnosis of infectious mononucleosis. The

TABLE 5.—*Hematologic and Serologic Follow Up in Ten Patients with Infectious Mononucleosis*

| | | | Number of Days Since Onset of Illness Until | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Hematologic Recovery | | | | Serologic Recovery | |
| Case | Age | Days Under Observation | Clinical Improvement (Discharge from Hospital) | Last Finding of Abnormal Lymphocytes | First Blood Count Without Abnormal Lymphocytes | Last Finding of a Mononuclear Count of 50% or More | First Blood Count with a Mononuclear Count Below 50% | Last Finding of an Abnormal Titer (1:112 or Over) of Sheep Agglutinins | First Finding of a Normal Titer (Less Than 1:56) of Sheep Agglutinins |
| 1 | 19 | 139 | 8 | 18 | 27 | 139 | Over 139 | 68 | 120 |
| 6 | 18 | 199 | 63 | 59 | 98 | 59 | 98 | 98 | Over 199* |
| 7 | 23 | 106 | 16 | 9 | 14 | 14 | 31 | 31 | 79 |
| 11 | 18 | 50 | 12 | 14 | 50 | 50 | Over 50 | 26 | Over 50* |
| 12 | 37 | 296 | 67 | 68 | 92 | 68 | 92 | 68 | 296 |
| 17 | 17 | 201 | 16 | 23 | 30 | 42 | Over 42 | 30 | 57 |
| 21 | 17 | 117 | 12 | .. | .. | 117 | Over 117 | 40 | 117 |
| 26 | 6 | 61 | 19 | 19 | 23 | 61 | Over 61 | 40 | 61 |
| 27 | 16 | 135 | 72 | 37 | 87 | 37 | 87 | 114 | 145 |
| 28 | 23 | 73 | 20 | 18 | 46 | 12 | 18 | 46 | 73 |
| | | From 50 to 296 | From 8 to 72 | From 9 to 68 | From 14 to 98 | From 12 to 68 | From 18 to over 139 | From 12 to 114 | From 50 to 296 |
| Average | 19 | 138 | 31 | 27 | 47 | 60 | .. | 56 | 119 |

* Not included in the computation of averages.

result of the test was accepted with considerable skepticism. When seen by me two months after the onset, the patient was worried over the possibility that he may have had agranulocytosis. The agglutination test for sheep cells was 1:56+. The differential test showed failure of the guinea-pig kidney to remove the agglutinins and their removal by beef cells, indicating that the patient was recovering from infectious mononucleosis.

The results indicate the persistence of the quality of the antibodies in infectious mononucleosis even at a time when they are quantitatively indistinguishable from the normal agglutinins for sheep cells. It is therefore necessary to employ the differential test in cases that suggest the possibility of mononucleosis even if the titer of the agglutinins is less than 1:112.

### HOW LONG DO THE HETEROPHILIC ANTIBODIES PERSIST IN INFECTIOUS MONONUCLEOSIS?

It was attempted to answer the question How long do the heterophilic antibodies persist in infectious mononucleosis? by a study of those cases which could be followed until the titers of the agglutinins for sheep cells returned to the normal level. Ten cases were followed up with blood counts and serologic tests. Only two will be reviewed in detail and then a summary of all ten cases will follow.

Table 4 shows the course of two such cases. The history of case 12 was presented previously. This patient was ill for forty-five days with gastric symptoms when the test was made. On the sixty-eighth day the titer was 1:112 and on the one hundred and seventeenth day it was still at the critical level of 1:56. On the next examination, on the two hundred and ninety-sixth day, the titer was within the normal limits (1:14). The so-called abnormal lymphocytes disappeared between the sixty-eighth and the ninety-second day, while the mononuclear count dropped to below 50 per cent at about the same time.

Case 17 might serve as another illustration. Here the drop of the titer from 1:224 to 1:56 occurred between the thirtieth and the forty-second day, and by the fifty-seventh day the titer fell to the normal level.

Table 5 summarizes the course of hematologic and serologic events in the ten patients. The clinical improvement was not always synonymous with a complete recovery but coincided in most cases with the discharge of the patient from the hospital. It paralleled quite closely the disappearance of the so-called abnormal lymphocytes. The drop of the mononuclear cells to below the 50 per cent level came about somewhat later. The number of 50 per cent was chosen arbitrarily as a rough indicator of a return to approximately normal relations. The disappearance of the abnormal lymphocytes and the return of the mononuclear count to below the 50 per cent level could be referred to as the hematologic recovery that followed the clinical recovery and was in turn followed by the serologic recovery, the latest of the three. The first finding of the normal titer of less than 1:56 varied from fifty to 296 days (average 119 days) after the onset of illness in the eight cases in which it could be observed.

The fifth and final group of cases in which the value of the differential test becomes particularly apparent are those with a history of a recent injection of immune horse serum and especially those with serum disease. In such a case the question arises whether the elevated titer of the heterophilic antibodies is due to infectious mononucleosis or to the serum injection. The following case belongs to that group:

CASE 27.—*Infectious mononucleosis with involvement of the central nervous system and complicated by serum disease.* A high school girl, aged 16 years, contracted a cold about Nov. 20, 1935. When she was seen by her physician two weeks later she had a high fever, a sore throat, and enlarged and tender cervical lymph nodes. The physician was called two days later and found the girl unconscious and in convulsions. The patient was admitted to the hospital, where the cerebrospinal fluid was found clear, with 18 cells per cubic millimeter. Antimeningococcus serum was given. The patient continued to be very restless and unconscious. On the third day after admission, she became conscious. An ulcerative and membranous pharyngitis set in at that time. The white blood count showed on admission 8,500 cells, with 60 per cent polymorphonuclear leukocytes and 40 per cent lymphocytes. In the course of the next few days the blood showed 54 per cent and later 61 per cent mononuclear cells, with 2 per cent of so-called abnormal lymphocytes. Four days later, the patient developed serum disease. A few weeks later when the encephalitic symptoms had subsided, the blood examination suggested the possibility of infectious mononucleosis. December 27 the test was strongly positive (1:896). The interpretation of the test was complicated by the history of recent serum disease. The high titer of the agglutinins for sheep cells could have been due to serum disease. The differential test showed complete absorption of the sheep agglutinins by beef cells and only partial removal by the guinea-pig kidney and established the diagnosis of infectious mononucleosis. The patient was followed hematologically and serologically for 135 days (table 5). The complicating involvement of the central nervous system and the absence of an elevated mononuclear count in the beginning of the disease are notable features.

### CONCLUSIONS

The test for heterophilic antibodies is of confirmatory diagnostic value in cases of infectious mononucleosis with typical clinical and hematologic features.

It is of a deciding diagnostic importance (*a*) for the early recognition of cases that show unusual hematologic signs and clinical symptoms, some of which are due to complicating factors, and (*b*) for the exclusion from the group of infectious mononucleosis of cases that are otherwise clinically and hematologically indistinguishable from it.

The differential test for infectious mononucleosis is of deciding diagnostic value (*a*) for the exclusion of cases that are clinically and hematologically indistinguishable from infectious mononucleosis and that have a so-called borderline titer of heterophilic antibodies (1:56 or 1:112); (*b*) for the recognition of late cases of infectious mononucleosis with a relatively low titer of heterophilic antibodies, and (*c*) for the recognition of cases that are complicated by a recent therapeutic injection of a horse immune serum or by serum disease.

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## ABSTRACT OF DISCUSSION

DR. RICHARD H. JAFFÉ, Chicago: There are two points in Dr. Davidsohn's paper in which I am much interested. I believe that the demonstration of the heterophilic antibodies suggests that infectious mononucleosis is a specific disease. So far some pathologists were inclined to consider infectious mononucleosis as the lymphatic reaction to any kind of infection, but now it seems to be a disease entity. Secondly, as Dr. Davidsohn has pointed out, the blood picture is not always characteristic, particularly in the early stages. There may be a polymorphonucleosis, and the demonstration of the heterophilic antibodies will help identify those cases in which the blood picture is not or not yet typical. As far as the blood picture is concerned, in some cases the characteristic large lymphatic cells are found. These lymphatic cells are not young lympho-

cytes and I don't think any differential diagnostic difficulties exist between the blood picture of infectious mononucleosis and acute leukemia. The character of the nucleus of the large lymphatic cells is that of the mature lymphocyte with a trabeculated chromatin structure. It is definitely different from the leptochromatic nucleus of the immature lymphocyte. The basophilic cytoplasm of the cells which gradually leads to plasma cells is much more characteristic than the structure of the nucleus. I have seen a few cases of infectious mononucleosis in which the outstanding hematologic finding was an increase of the monocytes, not of the lymphatic cells, and in which there were also atypical monocytic cells of the so-called Rieder type. With the aid of the demonstration of the heterophilic antibodies, it is now possible to show that all these cases belong in the same group. Since there now exists such a reliable test as Dr. Davidsohn has pointed out, the next step will be to look for the infective agent, which I think will be found to be a virus.

DR. A. S. GIORDANO, South Bend, Ind.: Dr. Davidsohn should be congratulated on this work, which began in 1927 when he was primarily interested in the determination of type of heterophile antibodies. The differential test that he has presented is of great aid to the clinical pathologist, who is frequently confronted with atypical cases which he cannot hematologically classify definitely in any particular group. The aid of the heterophile antibody and the other differential tests suggested by Dr. Davidsohn definitely establish the diagnosis. I wish to mention two cases from my experience that illustrate the value of these tests. The first patient was a girl, aged 18, sent home from college with a diagnosis of agranulocytic angina. Her white blood cell count was 1,200 per cubic millimeter. The lymphocytes ranged from 70 to 78 per cent. Some of the cells appeared immature and it was possible that the condition might be either leukemia or infectious mononucleosis, since there were only 8 per cent polymorphonuclear cells and the rest were monocytes. The heterophile antibody agglutination revealed an agglutination above 1:140. This quickly established a diagnosis, and a good prognosis was given to the father, who was a physician. The second patient was a child, aged 8 years. The pediatrician in the case found fever, an enlarged spleen, enlarged nodes and a white cell count of 20,000, with 82 per cent lymphocytes. The clinical diagnosis of acute lymphatic leukemia was made. In this case, too, the heterophile antibody quickly established the correct diagnosis of acute infectious mononucleosis. I can agree with everything that Dr. Davidsohn has said, but for the present it cannot be said definitely that infectious mononucleosis is really a clinical entity, since it can be mistaken for many other different clinical pictures. These cases can be classified serologically into one group and for the others one must wait until the etiology of the disease has been established. If anything has been learned from experience in other infectious diseases, it is known that in undulant fever the blood may have no agglutinins at all and some have low titers. The low titers in infectious mononucleosis are easily disposed of with the kidney absorption test, illustrating the point that low titers may be of great diagnostic significance.

DR. ISRAEL DAVIDSOHN, Chicago: My experience has been similar to Dr. Jaffé's. In none of my cases did I have any serious difficulty in differentiating the condition from acute leukemia. However, I was told only a few days ago by Dr. Hal Downey, an authority on the blood in infectious mononucleosis, that in his experience in about 5 per cent of the cases it is difficult to diagnose infectious mononucleosis from the blood examination alone. The differentiation from chronic leukemia is sometimes quite difficult, just as Dr. Jaffé mentioned. Furthermore, why not use a test that makes it possible to make the diagnosis so much easier than it is with the fine hematologic differentiation? I fully agree with Dr. Giordano and I want to state it once more that the serologic examination establishes merely a serologic group of infectious mononucleosis but does not permit any further conclusions. I stated last year while discussing the papers of Dr. McKinlay and Drs. Downey and Stasney at the meeting of the American Medical Association that there is reason to assume that there exist two types of infectious mononucleosis: the seropositive and the seronegative type.

# *Clinical Notes, Suggestions and New Instruments*

## THE FREQUENCY OF AIR UNDER THE DIAPHRAGM IN PERFORATED GASTRIC AND DUODENAL ULCER

### REPORT OF FORTY-TWO CONSECUTIVE CASES

SYDNEY E. JOHNSON, M.D., LOUISVILLE, KY.

Roentgenographic demonstration of air under the diaphragm in cases of perforated peptic ulcer has been reported by many authors and is mentioned briefly in all modern textbooks on roentgen interpretation. All authors agree that demonstration of spontaneous pneumoperitoneum is pathognomonic of perforation, but the reader is left in considerable doubt as to the frequency with which air can be demonstrated in such cases. Since the finding of air is pathognomonic, the value of this sign depends on the percentage of cases in which the sign can be elicited. With the idea of getting more definite information on this question, I have examined the charts of all patients admitted to the Louisville City Hospital during the past five years who have had an admission diagnosis of perforated peptic ulcer, seventy-six cases in all. Thirty cases must be eliminated because there was no x-ray examination. The remaining forty-six cases were examined roentgenologically; thirty-five gave the positive finding of air under the diaphragm and eleven were negative.

Of the eleven negative cases one must be eliminated because it was found at operation that the ulcer had not perforated. Three others are excluded because there is no operative or necropsy confirmation of the clinical diagnosis. The remaining seven patients in the negative (x-ray) group were proved by operation to have perforated ulcers.

All the thirty-five patients in the positive group were proved by operation or necropsy to have perforated ulcers.

In considering the available data in both the negative and the positive cases the following facts would appear to be of greatest importance: (1) the time elapsed between the perforation and the x-ray examination, (2) the size of the opening, and (3) the amount of scarring at the site of the ulcer. The site of the ulcer, the age of the patient and the sex may have some effect, but this is not indicated in our small group of cases.

The time elapsing between perforation and the roentgen examination is undoubtedly determinable with a high degree of accuracy, assuming that perforation coincides with the sudden attack of severe pain. Practically all the patients in our group gave the exact hour of the attack. The time between the attack and the roentgen examination in the thirty-five patients who showed air under the diaphragm ranged from one to thirty-six hours and averaged eight and one-half hours. The time in the seven patients who had perforated ulcers but no air averaged thirty-six hours and ranged from one hour to five days. In the roentgen-positive group the time was under ten hours in twenty-two patients and under twenty hours in all but four. In two patients of this group the time was thirty-six hours. Both of these patients had large perforations, the opening in one admitting the index finger of the operator.

With regard to the size of the perforations, the records are incomplete. The size is recorded in twelve of the thirty-five patients in the roentgen-positive group, with a range from 2 to 15 mm. and an average of 6.5 mm. In two of the roentgen-negative group the size is recorded as one-fourth inch and 4 mm., respectively.

There is no record as to the amount of scarring at the site of perforation, but this may bear some relation to the chronicity of ulcer symptoms. The duration of ulcer symptoms in the roentgen-negative group averages one and one-half months, with extreme limits of from three days to five years. In the roentgen-positive group the histories average three and one-half years, with extremes of from one month to thirty years. All the patients with very long histories gave positive roentgen signs. This may have a definite relationship to the amount of induration at the site of the ulcer.

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Age apparently has no effect in the demonstration of air under the diaphragm. The youngest patient in our positive group was a new-born white boy who had a perforated duodenal ulcer, bilateral inguinal hernia, pneumoperitoneum and pneumoscrotum. The oldest patient was a white woman aged 71. There are practically equal numbers in each of the four decades between the ages of 20 and 60 years, but there are only three females in the entire group.

The roentgen technic employed is fortunately very simple. Brilliant films are by no means necessary. Most of the films in our collection have been exposed with a small mobile unit in the ward or operating room. The one absolute essential is that the patient be put in the upright position during the x-ray exposure. It is helpful to turn the patient on his left side for a short period before elevating the upper part of the body.

SUMMARY

The series of forty-two cases of proved perforated gastric and duodenal ulcers gave a positive roentgen diagnosis in thirty-five, or 83 per cent. It is important that the roentgen examination be made as soon as possible after the perforation, as the small amount of air present is soon resorbed. With all factors under better control, the percentage of positive results will probably be considerably higher. The method is of decided value in differential diagnosis and is entitled to more emphasis than is given it in textbooks of roentgen interpretation.

## HEMOLYTIC TRANSFUSION REACTION PRODUCED BY THE BLOOD OF A "UNIVERSAL DONOR"

ELMER L. DEGOWIN, M.D., IOWA CITY

Since the blood of group O contains no agglutinogens, Ottenberg [1] in 1911 proposed the use of individuals of this group as "universal donors." It was thought that the agglutinins $\alpha$ and $\beta$ would be sufficiently diluted in the recipient's serum as to be ineffectual.

*Titration of Hemolysins and Agglutinins in Donor's Serum*

| Corpuscles | | | Dilutions of Donor's Serum (Oαβ) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1:4 | 1:10 | 1:12 | 1:16 | 1:20 | 1:30 | 1:40 | 1:50 | 1:60 | 1:70 | 1:80 | 1:90 | 1:100 | 1:110 |
| ABo | Henry (recipient).. | Hemolysis..... | 4+ | 2+ | 2+ | 1+ | 1+ | — | — | — | — | — | — | — | — | — |
| | | Agglutination | | | | | | | | | | | | | | |
| | Cole..... | Hemolysis..... | 4+ | 2+ | 1+ | — | — | — | — | — | — | — | — | — | — | — |
| | | Agglutination | | | ± | 1+ | 4+ | 4+ | 3+ | 3+ | 2+ | 1+ | 1+ | ± | — | — |
| Aβ | Hall..... | Hemolysis..... | 4+ | 2+ | 1+ | ± | — | — | — | — | — | — | — | — | — | — |
| | | Agglutination | | | 2+ | 4+ | 4+ | 4+ | 4+ | 4+ | 4+ | 3+ | 2+ | ± | — | — |
| | Randall..... | Hemolysis..... | 4+ | 2+ | 1+ | 1+ | — | — | — | — | — | — | — | — | — | — |
| | | Agglutination | | | | | | | | | | | | | | |
| Bα | DeGowin..... | Hemolysis..... | 2+ | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Agglutination... | 4+ | 4+ | 2+ | ± | — | — | — | — | — | — | — | — | — | — |
| Oαβ | Van Epps..... | Hemolysis..... | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Agglutination... | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

The practice of transfusing group O blood into individuals of other groups has become fairly common, although many writers have warned against it. Copher [2] stated that the use of the "universal donor" was dangerous. Levine and Mabee [3] studied the blood of one individual belonging to group O whose serum agglutinated the corpuscles of group A in a dilution of 1:120. Freeman and Whitehouse [4] found a group O blood the $\alpha$ agglutinin of which was active in a dilution of 1:80. The $\beta$ agglutinin reacted in a dilution of 1:48. Neither of these bloods was actually used for transfusions. Thomsen [5] determined the hemolysin titer of twenty-four serums of group O and found that the majority hemolyzed A corpuscles in dilutions of 1:4, although one was potent in a dilution of 1:64 and two were potent in a dilution of 1:16. In general, the $\alpha$ hemolysin was more potent than the $\beta$.

Hemolytic reactions from the transfusion of group O blood into recipients of other types have been reported by Unger,[6] Wichels and Lampe,[7] Tiber [8] and many others. Hesse [9] has recently collected forty-six cases from the literature in which group O blood caused reactions when injected into recipients of other groups. He reports a case of his own in which the group O serum of the donor agglutinated the recipient's A corpuscles in a dilution of 1:2,048. This is probably the highest titer on record.

As there are only three or four reports in which agglutinins in the donor's blood have been titrated, the following case seems worthy of consideration:

### REPORT OF CASE

E. H., a woman, aged 25, had a medical induction of labor in the University Hospital June 6, 1936. Postpartum fever developed for which a blood transfusion was contemplated. The patient was found to belong to group AB. No donors of this type were available from the hospital donor list at that time, so her blood was cross-matched with that of a group O donor by the open slide technic of Vincent. No agglutination or hemolysis occurred in the mixture of the donor's corpuscles and the recipient's serum, but the donor's serum was seen to produce prompt agglutination and hemolysis of the recipient's cells. As this reaction was expected, citrated blood from the donor was transfused slowly into the patient by gravity. When 125 cc. of blood had been given, the patient complained of a feeling of constriction in the chest and severe shortness of breath. The administration of blood was promptly discontinued. She became intensely cyanotic and dyspneic. A marked chill occurred and the oral temperature

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1. Ottenberg, Reuben: Studies in Iso-Agglutination: I. Transfusion and the Question of Intravascular Agglutination, J. Exper. Med. **13**: 425-438, 1911.
2. Copher, G. H.: Blood Transfusion: A Study of 245 Cases, Arch. Surg. **7**: 125-153 (July) 1923.
3. Levine, P., and Mabee, J.: A Dangerous "Universal Donor" Detected by the Direct Matching of Bloods, J. Immunol. **8**: 425-431 (Nov.) 1923.
4. Freeman, G. C., and Whitehouse, A. J.: The "Dangerous Universal Donor," Am. J. M. Sc. **172**: 664-667 (Nov.) 1926.
5. Thomsen, O.: Hämolyse nach Transfusion von Universalspenderblut, München. med. Wchnschr. **76**: 873-874 (May 24) 1929.
6. Unger, L. J.: Precautions Necessary in the Selection of a Donor for Blood Transfusion, J. A. M. A. **76**: 9-11 (Jan. 1) 1921.
7. Wichels, P., and Lampe, W.: Theoretisches und Praktisches zur Bluttransfusion, München. med. Wchnschr. **75**: 1243-1245 (July 20) 1928.
8. Tiber, A. M.: Observations on Blood Grouping and Blood Transfusion, Ann. Surg. **91**: 481-488 (April) 1930.
9. Hesse, E.: Ueber die Verwendung des sogenannten Universalspenders bei der Bluttransfusion, Deutsche Ztschr. f. Chir. **245**: 371-382, 1935.

rapidly rose to 106.2 F. The pulse rate was 140 and the respiratory rate 44 per minute. Two hours after the transfusion the recipient's blood serum was found to be tinged with hemoglobin, and the van den Bergh reaction was 2.0 (biphasic). There was no hemoglobinuria or oliguria. The symptoms persisted only a few hours and by the next day she felt well. The postpartum fever had disappeared and the van den Bergh reaction on the blood plasma was 0.5 (indirect). Recovery from hemolytic reaction and from postpartum fever was complete and prompt.

### STUDY OF DONOR'S SERUM

The donor, a healthy man, aged 27, had never received blood in a transfusion and had had no severe illnesses, either recent or remote. His blood was retyped and belonged to group O. The recipient's blood was checked and established as group AB.

Tests for hemolysis and agglutination were set up in 8 mm. test tubes. Five-tenths cubic centimeter of a 0.25 per cent suspension of corpuscles in physiologic solution of sodium chloride was added to each tube containing 0.5 cc. of various dilutions of the donor's serum in physiologic solution of sodium chloride. The mixtures were well shaken and read after one hour at 37 C. The results are included in the accompanying table. (Agglutination was observed but not recorded with the cells of Henry and Randall.) It can be concluded from this that the $\alpha$ agglutinin of the donor was potent in a dilution of 1:80 and the corresponding hemolysin in a dilution of 1:12 to 1:20. The $\beta$ agglutinin was active only in a dilution of 1:12.

### COMMENT

It is one thing to state that a certain serum contains an agglutinin which causes agglutination of a 0.25 per cent suspension of A corpuscles in a test tube, well shaken, at 37 C. in the course of one hour. However, it is almost unpredictable how much agglutination and hemolysis that same serum will cause when injected at the rate of 10 cc. per minute into the median basilic vein of a group AB recipient. It is obvious that near the site of injection the antibodies will be more concentrated. The blood corpuscles and, perhaps, the fixed tissues of the recipient will absorb a certain amount of agglutinins. The amount of free hemoglobin in the blood stream and the amount of agglutination required to produce a serious clinical reaction in man is unknown.

Nevertheless, it may be of interest to use the physical constants that are known in this case to calculate what would take place if the injected agglutinins and hemolysins were not absorbed. The recipient weighed 68 Kg. If one assumes that 8.8 per cent of her body weight was blood,[10] the blood weight was 5,456 Gm. The hemoglobin was approximately 80 per cent. No hematocrit determination was made, but it may be assumed that 68 per cent, or 3,710 Gm., of the blood was serum. If the donor's blood was normal, 75 cc. of serum was injected. If an average value of 1.050 is taken for the specific gravity, the weight of serum injected was 78.75 Gm. If one ignores the possible effects of dilution of serum with corpuscles, the donor's serum should have attained a dilution in the recipient's serum of 1:47. According to the tests in vitro, the 75 cc. of donor's serum should have agglutinated all the recipient's corpuscles in an hour. This obviously did not take place, so absorption must have immobilized most of the hemolysins and agglutinins injected.

The only safe statement to make from these data is that the injection of 125 cc. of blood from this group O donor into an individual of group AB is dangerous. The same also applies to a group A recipient. A group B recipient could probably safely receive this donor's blood.

### SUMMARY

The injection of 125 cc. of blood from a certain group O donor into a group AB recipient, who was only slightly anemic, produced a severe reaction with evidence of hemolysis in vivo. The donor's blood was found to contain an $\alpha$ agglutinin active in a dilution of 1:80 and a corresponding hemolysin active in a dilution of from 1:12 to 1:20. The $\beta$ agglutinin was potent only in a dilution of 1:12.

10. Wiggers, C. J.: Circulation in Health and Disease, ed. 2, Philadelphia, Lea & Febiger, 1923, p. 614.

## TIDAL IRRIGATION OF EMPYEMA CAVITIES WITH SIMPLIFIED APPARATUS

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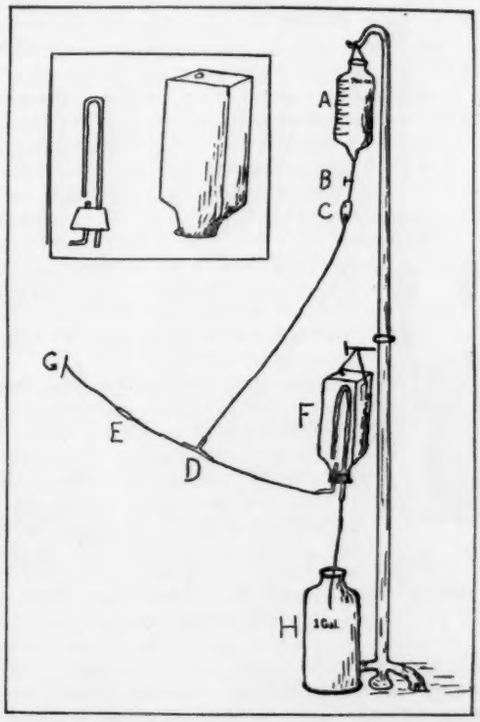
There appeared in the December 1935 issue of *International Clinics*[1] an excellent article on the treatment of acute empyema in which attention was directed to the value of "tidal irrigation" in promoting early complete closure of an empyema cavity.

The procedure was accomplished by a series of two or more bottles so arranged as to hydrostatics that alternate irrigation and mild suction would be applied to the pleural cavity. The principle seemed excellent, but the recommended apparatus seemed quite intricate.

The apparatus here described is offered as a simplified method of carrying out tidal irrigations and has been found to function in an excellent manner.

Irrigating fluid is supplied from a reservoir through a drip, the flow of which is regulated by a screw clamp. As the fluid drips into the irrigating system, it flows into the pleural cavity and into the bottle as illustrated. This bottle carries an open end inverted U tube, which acts as a siphon when the bottle is




Simplified apparatus for tidal irrigation of empyema cavities: *A*, 700 cc. flask; *B*, Hoffman clamp; *C*, drip; *D*, T tube; *E*, visible connector; *F*, bottle and siphon (shown also in inset); *G*, catheter into pleural cavity; *H*, gallon receptor.

full. The height of the bottle is such that the upper fluid level will be about 3 or 4 cm. above the level of the empyema cavity while the lower fluid level will be about the same distance below the cavity. A minute vent in the top of the bottle prevents the siphon from acting until the fluid reaches the higher level in the bottle. By this arrangement the pleural cavity is alternately irrigated at a slight positive pressure and aspirated at a slight negative pressure. During both of these processes there is a "tidal" to and fro motion of the fluid in and out of the chest cavity synchronous with respiration. The latter action tends to keep the irrigating system open and break up fibrin particles.

With this apparatus in operation one is able to see pus and fibrin propelled along the tubing toward the bottle with each respiratory excursion. When the fluid nears the upper level of the bottle the solution in the tubing clears, showing that irrigation is taking place. When the fluid is at a low level the solution becomes quite turbid, as evidence that suction is emptying the pleural cavity.

An adjustment between the relative amounts of suction and irrigation or the pressure in the system can be regulated by

1. Hart, Deryl: Treatment of Acute Empyema, Internat. Clin. 4: 184 (Dec.) 1935.

the relative height of the bottle to the pleural cavity. I have found that a bottle 20 cm. high and with a capacity of 700 cc. works very satisfactorily and will empty about once in thirty minutes when fluid is added by a moderately slow drip.

Clinical results have been excellent in all cases in which this apparatus has been used in conjunction with a closed type of thoracotomy.

Stuart Building.

## Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT. HOWARD A. CARTER, Secretary.

### SW-500 DELUXE MODEL SHORT WAVE GENERATOR ACCEPTABLE

Manufacturer: The Liebel-Flarsheim Company, Cincinnati.

The SW-500 DeLuxe Model Short Wave Generator is recommended for medical and surgical diathermy and hyperpyrexia. Application of the current may be made by the coil (electromagnetic field), pad or cuffs, and so-called spaced plates (electric field). The firm does not make any claims of advantages of one method of application over another, except that one method may be more convenient than another in some instances. Standard accessories supplied with the machine consist of supply cable, two 4 by 6 inch pad electrodes, two 6 by 8½ inch pad electrodes, two 9½ inch diameter plate electrodes, one 11 foot inductance cable, two 5 inch diameter plate electrodes, two adjustable supporting arms for plate electrodes, one set of felt spacers, one roll of elastic bandage and one set of cable retaining clips. Special applicators and surgical accessories are available as extras. The shipping weight of the unit is about 200 pounds.

De Luxe Model SW-500 Short Wave Generator (Liebel - Flarsheim).

High frequency currents of two wavelengths are available: one between 6 and 8 meters, the other between 18 and 20 meters. The power consumption is about 700 watts on 110 volt alternating current line.

The firm was asked to submit evidence substantiating the claims made for the heating ability of the unit. The firm engaged a reliable investigator to conduct the tests. He seated the subject in a comfortable position, with the legs spread apart. An incision was made in the thigh, approximately 6.3 inches from the knee, under aseptic conditions. A cannula was inserted in the quadriceps extensor muscle and in the subcutaneous tissue. Temperatures were read by three thermocouples of copper constantan, especially prepared to facilitate manipulation of them for taking readings at the cannula and on the surface of the skin. The thermocouples were removed from the field when the short wave current was passed through the thigh.

The voltage generated by the thermocouples was read by a type K potentiometer, manufactured by Leeds and Northrup Company. The thermocouples and potentiometer were calibrated in degrees Fahrenheit. Six observations were recorded.

A cotton face towel was held over the thigh on each side of the cannula. The under side of the thigh was uncovered, since the patient rested in a sitting position. Electrodes were 4.8 and 9.5 inches in diameter, and placed 1.4 inches from the skin surface. The 6 to 8 meter band was employed.

Readings were taken after every five minutes of application until a total of twenty minutes of application had been administered. The average time consumed during the temperature readings was three and one-half minutes. The cooling time temperature readings were also taken at ten and twenty minute intervals after the twenty minute application ceased. Oral temperatures were taken at the beginning and end of each treatment.

The time allowed between successive tests for the local temperature to drop to normal was sixty minutes.

The averages of six observations are recorded in table 1.[1]

1. The Council did not use these data as a basis for acceptance.

The manufacturer cooperated with the Council by submitting the short wave diathermy unit and the aforementioned data for consideration. The Council selected an independent investigator to test the unit. He conducted tests using the 6 to 8 meter band and employing "spaced-plate" electrodes. Three subjects were used in this test and a total of eight observations were recorded. The subject's treatment table had to be raised on four chairs before it was possible to apply the electrodes because the holders were too short when the subject was in a recumbent position. Two trocars placed in hard rubber cannulas were inserted into the thigh. One was inserted midway between Poupart's ligament and the knee and straight down into the depth of the muscular tissue until the instrument was at an approximate depth of 2 inches, or until the femur was encountered. The second was introduced as nearly parallel to the skin as possible and subcutaneously at an approximate depth of one-eighth inch. The trocars were removed, leaving the rubber cannulas in situ. Temperature measurements were then taken by means of thermocouples of the hypodermic needle type and introduced through the cannulas. The constant junction was immersed in ice enclosed in a quart vacuum bottle. The electromotive force due to the difference in temperature of the junctions was read in millivolts from the Leeds and Northrup portable potentiometer. The thermocouples were calibrated in degrees Fahrenheit against a Bureau of Standards certified thermometer. Initial temperatures were taken and then each subject was submitted to a twenty minute application of maximum current intensity consistent with skin comfort. At the end of this period, temperatures were again recorded until the temperature began to drop. The highest temperature attained was recorded as the final temperature in each instance. Oral temperatures also were taken.

TABLE 1.—*Average Temperatures of Six Observations*

| Deep Muscle | | Subcutaneous | | Oral Temp. | |
|---|---|---|---|---|---|
| Initial | Final | Initial | Final | Initial | Final |
| 97.5 | 104.8 | 96.9 | 104.1 | 98.6 | 99.1 |

The "spaced-plate" electrodes, 4.8 inches in diameter, were placed laterally on the thigh equidistant from the cannulas. The distance from the skin to the electrode was from 1¼ to 2 inches.

Each reading in table 2 is the average of eight observations obtained on the spaced plates.

The results of the Liebel-Flarsheim tests indicate that the final temperatures in the muscle, subcutaneous tissues and mouth are somewhat higher than those obtained by the Council's investigator. It is to be remembered that, in the investigation carried out under the direction of the firm, the subject was placed in a sitting position, whereas in the Council's investigation the subject was in a recumbent position, or in the position in which patients are ordinarily treated.

A discussion of the reasons for the difference in results of the two investigations may be of interest. When the Council's subject was in a recumbent position, he was lying on a nonconducting and nonmetallic couch. A portion of the electrical energy, however, may have been absorbed by the mattress and the couch. On the other hand, with the firm's subject in a sitting position, there was less foreign material to absorb the energy, and furthermore precautions were taken to keep the other leg away from the inside electrode. In the thighs of the subjects investigated by the Council, the cannulas were inserted from 1 to 1½ inches proximal to the knee from those in the manufacturer's subject. The diameter of the "spaced-plate" electrode used by the Council's investigator was 4.8 inches, whereas the manufacturer's investigator used electrodes 4.8 and

TABLE 2.—*Average Temperatures in Eight Observations on Spaced Plates*

| Deep Muscle | | Subcutaneous | | Oral Temp. | |
|---|---|---|---|---|---|
| Initial | Final | Initial | Final | Initial | Final |
| 99.5 | 102.9 | 98.9 | 102.6 | 99.1 | 99.4 |

9.5 inches in diameter. The foregoing citations may account for some of the differences in the temperatures between the two investigations.

However, the Council's results indicate that the unit meets the minimum requirements; that is, what can be expected from the application of conventional diathermy—with a metal electrode on the medial aspect of the thigh and another metal electrode on the lateral aspect of the thigh—the method of application that has been adopted as a minimum standard of acceptance.[2]

The temperature rise of the transformer, after the machine had been operated at full load for two hours, came within the limits of safety prescribed by the Council. Burns may be produced but may be avoided by ordinary precaution. Their likelihood to occur is much less than with conventional diathermy.

The machine was installed in a clinic acceptable to the Council and operated under actual clinical conditions for three months. It was reported as giving satisfactory service. In view of the favorable report based on the data obtained by the Council's investigator, using "spaced plates," applied laterally, the Council on Physical Therapy voted to include the SW-500 DeLuxe Model Short Wave Generator in its list of accepted devices.

# Council on Foods

## ACCEPTED FOODS

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COUNCIL ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOLLOWING ANY NECESSARY CORRECTIONS OF THE LABELS AND ADVERTISING TO CONFORM TO THE RULES AND REGULATIONS. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION.

FRANKLIN C. BING, Secretary.

### RED STAR FRESH COMPRESSED YEAST

*Manufacturer.*—Red Star Yeast and Products Company, Milwaukee.

*Description.*—Fresh compressed yeast with added starch and vegetable oil.

*Manufacture.*—A mash of small grains, composed principally of cooked corn, barley malt and barley malt sprouts, is maintained at an optimum peptonization temperature and later saccharification temperature until the starch has been converted to soluble carbohydrates. Lactobacilli are introduced and allowed to grow until a desired acidity is reached. The mash is held at pasteurization temperature for several hours and filtered. The filtrate is treated with seed yeast prepared from pure culture yeast. The fermentation proceeds under forced aeration with filtered air and temperature control. The yeast growth is separated by centrifugation, cooled, mixed with starch, collected on filter cloths in filter presses, packed in 75 pound wax-paper lined boxes, and refrigerated. The bulk yeast is shipped under refrigeration to branch warehouses located in the important market centers, where the yeast is mixed with a small amount of water and refined vegetable oil, cut down to desired commercial sizes and wrapped for distribution. Stock not to exceed two days' requirements is maintained at the branches and sub-branches to assure freshness. Unsold yeast in retail stores is regularly replaced with fresh stock without charge.

*Analysis* (submitted by manufacturer).—Moisture 68.0%, total solids 32.0%, ash 1.8%, fat (ether extract) 0.3%, protein (N × 6.25) 12.0%, unsaponifiable matter (largely vegetable oil) 0.1%, starch (foil wrapped package) 9.0% and total carbohydrates (by difference) 17.9%.

*Calories.*—1.2 per gram; 34 per ounce.

*Vitamins.*—One cake (19 Gm.) contains approximately 19 International Units of vitamin $B_1$ and 38 Sherman Units of vitamin G.

*Claims of Manufacturer.*—A rich source of vitamins B and G. It is mildly laxative to many persons.

2. Mortimer, Bernard, and Osborne, S. L.: Tissue Heating by Short Wave Diathermy, J. A. M. A. **104**: 1413 (April 30) 1935.

### (1) SEXTON BRAND STRAWBERRIES, JUICE PACKED
### (2) SEXTON BRAND RED RASPBERRIES, JUICE PACKED
### (3) SEXTON BRAND LOGANBERRIES, JUICE PACKED
### (4) SEXTON BRAND BLACKBERRIES, JUICE PACKED

*Manufacturer.*—John Sexton & Company, Chicago.

*Description.*—(1) Canned strawberries, packed in juice. (2) Canned red raspberries, packed in juice. (3) Canned loganberries, packed in juice. (4) Canned blackberries, packed in juice.

*Manufacture.*—Berries picked at the proper stage of ripeness are inspected (strawberries hulled), graded for quality and size, automatically filled into cans and weighed. Cans filled with juice (extracted from ripe fruit prepared similarly, heated, pressed and filtered) are exhausted, sealed and processed.

*Analyses* (submitted by manufacturer).—(Analyses of entire contents including liquid):

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Moisture | 87.5% | 84.9% | 86.7% | 88.0% |
| Total solids | 12.5 | 15.1 | 13.3 | 12.0 |
| Ash | 0.5 | 0.4 | 4.4 | 0.5 |
| Fat (ether extract) | trace | 0.1 | 0.1 | 0.1 |
| Protein (N × 6.25) | 0.6 | 0.7 | 0.8 | 0.8 |
| Crude fiber | 0.7 | 2.5 | 2.1 | 3.5 |
| Carbohydrates other than crude fiber (by difference) | 10.7 | 11.4 | 9.9 | 7.1 |

*Calories.*—(1) 0.45 per gram, 13 per ounce; (2) 0.49 per gram, 14 per ounce; (3) 0.43 per gram, 12 per ounce; (4) 0.32 per gram, 9 per ounce.

*Claims of Manufacturer.*—For diets in which sweetened fruit is proscribed.

### (1) CONGRESS BRAND CRYSTAL WHITE SYRUP
### (2) K. C. BRAND GOLDEN SYRUP

*Distributor.*—Kansas City Wholesale Grocery, Kansas City, Mo.

*Packer.*—Union Starch and Refining Company, Granite City, Ill.

*Description.*—(1) A table syrup; corn syrup sweetened with sucrose; flavored with vanilla extract. The same as Pennant Crystal White Syrup (THE JOURNAL, Jan. 30, 1932, p. 402).

(2) A table syrup; corn syrup flavored with refiners' syrup. The same as Pennant Golden Table Syrup (THE JOURNAL, Jan. 30, 1932, p. 403).

### JACOB MUSHROOMS "FILLETS"

*Manufacturer.*—Grocery Products Manufacturing Corp., West Chester, Pa.

*Description.*—Hothouse mushrooms cut in "fillet" like slices.

*Manufacture, Analysis and Calories.*—Essentially the same as Jacob Mushrooms Broth, Fancy Buttons, Sliced, Sliced Stems and Pieces (THE JOURNAL, Sept. 15, 1934, p. 838).

### BADGER BRAND EVAPORATED MILK
### SUNCREST BRAND EVAPORATED MILK

*Manufacturer.*—Consolidated Badger Cooperative, Shawano, Wis., subsidiary of Land O'Lakes Creameries, Inc., Minneapolis.

*Description.*—Unsweetened evaporated milk.

*Manufacture.*—The procedure of evaporation and canning, and the analysis are essentially the same as for Land O'Lakes Unsweetened Evaporated Milk (THE JOURNAL, July 28, 1934, p. 260).

### KEYCO BRAND PINEAPPLE JUICE

*Distributor.*—Keystone Wholesale Grocery Company, Reading, Pa.

*Packer.*—Hawaiian Pineapple Company, Ltd., San Francisco.

*Description.*—Canned Hawaiian pineapple juice retaining in high degree the natural vitamin content; the same as Dole Hawaiian Finest Quality Pineapple Juice (Unsweetened) (THE JOURNAL, June 3, 1933, p. 1769).

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SATURDAY, JANUARY 23, 1937

## OPIUM TRAFFIC IN THE UNITED STATES

As part of the international policy of controlling traffic in opium and other dangerous drugs, each nation signatory to the International Drug Conventions is supposed to prepare an annual report. The report of the United States of America for the year ended Dec. 31, 1935, has been prepared and published by the Bureau of Narcotics of the Treasury Department.[1] The number of nonmedical drug addicts in the United States is difficult to determine accurately, but, while formerly believed to approximate one person in every thousand of the population, recent surveys indicate that this figure no longer obtains in many sections of the country. In the nature of a further inquiry into the problem of addiction, the Bureau of Narcotics examined the records of 1,397 of the persons investigated in connection with violation of the narcotic laws as to their personal use of drugs. Of these, 946 were found to be addicted to some form of opium or coca derivative, the other 451 giving no evidence of addiction. Of the addicts, 757 were male and 159 female. The average age of the men was 41 and of the women 35. Seven hundred and seventy-five were white, eighty-eight oriental, seventy-eight colored and three American Indian, while in two instances the race was not reported. A striking feature was the educational background of these addicted violators. Five hundred and twenty had attended only grade school, 211 had reached high school but not college, and 153 had received some college or university training. These figures indicate a considerably higher percentage of moderately educated people than that existing among the general public.

The reasons given for drug addiction were of interest. In 486 instances "associations" were blamed; in 337, illness or injury was named as the responsible factor; other causes mentioned less frequently were indulgence or drink in fifty, mental strain or nerves in fourteen, curiosity or experiment in ten, physical strain or overwork in six and deliberate addiction in one. The previous criminal records of the 946 addicts included 545 charges of felony, 468 misdemeanors and 1,887 violations of either federal or state narcotic laws. This is an extremely high criminal record; higher, in fact, than that found in any other group of lawbreakers.

The heaviest arrivals of raw opium in 1935 were in the Atlantic Coast area. There were fourteen seizures, three of which concerned fairly large quantities: 23, 19 and 17 Kg. The largest seizures of prepared opium were effected in the Pacific Coast area, almost all of which came from China and appeared to be mostly a blend of Chinese and Persian opium. More than twice as much smoking opium was seized in the United States in 1935 as in 1934, amounting in 1935 to 779 pounds. Morphine was seized in every area reviewed except Hawaii. The total quantity seized during the calendar year 1935 showed an increase of 27.5 per cent over that seized the previous year. The amount of heroin seized showed an increase of about 19 per cent over the previous year. The amount of cocaine taken, however, showed a decrease of 63 per cent as compared with that seized in 1934. The records as a whole contain substantial evidence in the form of labels, packages and detailed reports to show the existence of an extensively organized narcotic traffic in the Far East. The Opium Advisory Committee of the League of Nations has previously called attention to the extreme dangers resulting from this situation.

Closely allied with the opium traffic is the present situation with regard to Indian hemp, or marihuana. There is as yet no federal legislation penalizing traffic in this drug, and federal efforts are at present largely confined to restriction of imports and cooperation with those states or local bodies which have effective regulations.

The effectiveness of federal efforts to control the drug traffic, in cooperation with the League of Nations, is manifest by the amounts of drugs seized, the relatively smaller quantities in which they are transported and the high percentage of convictions obtained for violation of the laws. In this connection it is noteworthy that for every agent in the federal field service there are ten convicted narcotic violators in the federal penitentiaries. Only about 511 Kg. of narcotic drugs was seized in 1935, as compared with 3⅓ tons during the fiscal year 1931, when smuggling was rampant. Much smaller shipments are now found, combined with higher adulteration and increased retail price. The number of criminal violations detected rose from 4,742 in 1934 to 5,200 in 1935, while the convictions increased from 1,816 in 1934 to 2,065 in 1935. The two problems of greatest menace at the present time seem to be the rise in use of Indian hemp with inadequate control laws and the oversupply of narcotic drugs available in the Far East, which threatens to inundate the Western world.

1. Anslinger, H. J.: Traffic in Opium and Other Dangerous Drugs for the Year Ended December 31, 1935, U. S. Treasury Department, Bureau of Narcotics, U. S. Government Printing Office, Washington, 1936.

## LIVER DEATH A HEPATORENAL SYNDROME

The close association of the liver and the kidneys in the performance of certain metabolic processes dealing with detoxification of various substances by the former and their excretion by the latter suggests a definite interdependence. Disease states of the liver may cause pathologic alterations in the kidneys. Bartlett [1] has described renal complications in infectious diseases of the bile passages. Clairmont, von Haberer, Staeheli, Kehr and others have described cases in which anuria followed cholecystectomy or an operation for the relief of obstructive jaundice. They believe that the anuria is caused by a reflex spasm of the renal vessels and that the origin of the reflex is the damaged liver. This is supported by the histologic determination of contracted capillaries of the glomeruli and of the afferent renal vessels.

Among the hepatic diseases that lead to secondary renal involvement, so-called liver death has come to occupy a prominent position. This refers to death taking place after an operation on the bile tracts or following a traumatic injury to the liver. Heyd [2] was the first to advance the concept of liver death as a postoperative complication. He divided this unusual but distinct postoperative complication into three clinical groups. Patients in group 1 present, as a rule, a history of long-standing disease of the biliary tract but are otherwise apparently good surgical risks. The blood and the urine are normal and there are no signs of organic disease. Following a cholecystectomy, the patient passes into a semicomatose state with rapidly mounting elevation of temperature, and death supervenes in from twenty-four to forty-eight hours. Group 2 is represented by a patient who is jaundiced and who is not as good a risk as the patient in group 1. He is properly prepared for the operation and is not necessarily a bad risk. He makes, as a matter of fact, a satisfactory recovery from one of the routine operations on the gallbladder or the bile tract. After two or three normal days, however, the aspect of the patient changes, with somnolence, irritability, nervousness, rise of temperature, oliguria, coma and death in the next twenty-four or forty-eight hours. In group 3 the patient presents symptoms of calculous cholangeitis, perhaps with some involvement of the pancreas. After five or six days of satisfactory progress following an operative procedure, oliguria develops, which may pass on to be total anuria and death with symptoms of uremia. Heyd's observations were soon followed by those of Cave, Stanton, Graham, Helwig, Schutz and Kuhn, Petrén, Ravdin and others, so that in 1934 Heuer was able to collect from the literature ninety-five instances of liver death.

A new factor was introduced into the concept of liver death when Furtwaengler in 1927 reported from Clairmont's clinic a case in which a young woman, after an automobile injury, experienced a fatal course precisely like that of the patients in Heyd's group 3. Helwig and Orr reported a case of liver death following traumatic rupture of the liver. Postmortem examination of the two cases revealed, in addition to the traumatic necrosis of the liver tissue, high grade necrosis of the renal cortex. In 1932 Schutz, Helwig and Kuhn [3] reported six cases of liver death. These authors believed that the death was not due to cessation of liver function, since there was no impairment in glycogenesis, nor was there any evidence of failure to deamidize the amino acids, since urea formation was unhampered and a progressive increase in the nitrogenous products in the blood was found in every case. The stools contained bile, and no evidence of any lack of hepatic function was found. The clinical picture of their cases was that of from five to eight normal postoperative days, followed by abdominal distention, vomiting, rise in temperature, oliguria, appearance of albumin, casts and red cells in the urine, increase in the residual blood nitrogen, bleeding into the mucous surfaces, much blood in the vomitus and the stool, coma and death. Postmortem examination revealed pronounced fatty degeneration of the liver, cloudy swelling, leukocytic infiltration, focal hemorrhages and parenchymatous cell necrosis. The most striking histologic observation in the kidneys was degeneration of the epithelium lining the convoluted tubules. Submucous hemorrhages were found with especial frequency in the gastro-intestinal tract and next in the interstitial pulmonary tissue, the skin and the gums. Jaundice was absent, as a rule. Boyce and McFetridge [4] showed that the so-called hepatorenal syndrome may develop in diseases other than those of the liver and the bile tracts; namely, in burns, intestinal obstruction and hyperthyroidism. Weller found in forty-four necropsies on patients dying of hyperthyroidism that the liver was normal in only six.

A number of investigators attempted to reproduce the hepatorenal syndrome in animal experiments. Gundermann in 1913 tied the left portal vein in rabbits and caused atrophy of two thirds of the liver. Oliguria develops, with albumin, casts and red cells in the urine. Boyce and McFetridge were able to reproduce the clinical and pathologic picture of the hepatorenal syndrome in rabbits by first causing an obstruction of the biliary tree and later releasing the obstruction. The most interesting feature of their report was the reproduction of the syndrome by injection into animals of a saline or a watery extract of the liver of a human

1. Bartlett, Willard, Jr.: Renal Complications of Biliary Tract Infections, Surg., Gynec. & Obst. **56**: 1080 (June) 1933.
2. Heyd, C. G.: Liver and Its Relation to Chronic Abdominal Infections, Ann. Surg. **79**: 55 (Jan.) 1924.
3. Schutz, C. B.; Helwig, F. C., and Kuhn, H. P.: A Contribution to the Study of So-Called Liver Death, J. A. M. A. **99**: 633 (Aug. 20) 1932.
4. Boyce, F. F., and McFetridge, Elizabeth, M.: So-Called Liver Death: A Clinical and Experimental Study, Arch. Surg. **31**: 105 (June) 1935.

being who died following a cholecystectomy with the typical syndrome of hyperpyrexia of Heyd's group 1. Pytel [5] stated that he was able to reproduce the hepatorenal syndrome in rabbits by ligation of the hepatic artery, by subcapsular traumatization of the liver, by intraperitoneal and intravenous injection of liver extracts prepared from livers of animals in which the syndrome was produced, and by the injection of blood from such animals into normal animals.

A number of theories have been advanced to explain the liver death. Helwig, Orr and Schutz believe that an unknown powerful toxic substance is generated in the necrotic liver tissue and that this toxin exerts a specific effect on the renal tissue, causing degeneration and necrosis of the epithelium of the convoluted tubules. Boyce and McFetridge, as well as Pytel, do not believe in a specific toxic effect on the kidney but regard the alterations in the renal epithelium as the result of an overtaxed normal physiologic process, the excretion of foreign proteins by the convoluted tubules. The significance of the hepatorenal syndrome lies in the fact that every case of disease of the biliary passages is associated, as established by Reimann and by Graham, with more or less hepatic involvement. Unfortunately, exact tests of the liver function have not been evolved. Wilensky suggested that the renal function might be regarded as the reflection of the hepatic function. Among measures that may render an operative intervention on the liver or the bile tracts safer, the following are recommended: careful tests of the hepatic and renal functions, administration of dextrose and fluids in large amounts, administration of calcium, lessening the amount of trauma and exposure of the liver in the course of the operation, abstaining from suturing the fossa of the gallbladder, and the proper selection of an anesthetic.

5. Pytel, Anton: Zur Frage des Hepatorenal Syndromes, Arch. f. klin. Chir. **187**: 1, 1936.

## *Current Comment*

### WILLIAM ALLEN PUSEY HONORED

The January 1937 issue of the *Archives of Dermatology and Syphilology* is a special number dedicated to Dr. William Allen Pusey. The honorary volume was authorized by the Board of Trustees of the American Medical Association in recognition of the founding of the publication by Dr. William Allen Pusey and of his devoted service to it since that time. All the contributors have been associated with Dr. Pusey in various activities. In addition to tributes to Dr. Pusey as a leader in organized medicine by Dr. Olin West, as editor by Dr. Morris Fishbein, as educator by Dr. D. J. Davis and as a historian and litterateur by Dr. James B. Herrick, there is a statement on Dr. Pusey as a citizen by Rufus C. Dawes. Next come articles on Dr. Pusey's contributions to cutaneous medicine and syphilis by Dr. C. Guy Lane, and a biographic study by his assistant, Dr. Herbert Rattner. The remainder of the volume is devoted to articles by associates and colleagues of Dr. Pusey. These articles concern various scientific dermatologic subjects. Especially important is an extensive contribution by Dr. Leonard F. Weber on external causes of dermatitis, which constitutes a complete listing of chemical substances, plant substances and other materials which have from time to time been reported as irritant causes of dermatitis. Dr. Pusey retires as editor of the *Archives of Dermatology and Syphilology* with the current issue. The new editor, Dr. Howard Fox, concludes the special issue with an editorial rendering tribute to the manner in which the *Archives* has been brought by Dr. Pusey to the leading place which it occupies in the dermatologic literature of the world.

### STAINS FOR TISSUE OF THE NERVOUS SYSTEM

The methylene blue staining method introduced by Ehrlich in 1885 contributed more than any other staining method (Weigert's hematoxylin, silver nitrate) to our knowledge of the anatomy of the peripheral and sympathetic nervous system. During the last two decades Russian investigators have perfected this method to such an extent that it has become possible to follow up by mere dissection the distribution of the sympathetic nerve fibers over large areas in an animal's organ without previous fixation, embedding and sectioning. It has become possible to stain areas termed by Worobiew macromicroscopic, that is, intermediary areas as it were, bordering on gross and microscopic fields.[1] After careful and critical analysis of the factors that constitute the rationale of the methylene blue staining method, Schabadasch [2] has succeeded in perfecting the method and has made it possible to follow up not only the macromicroscopic areas but also microscopic fields under magnifications as high as 1,200. He calls his method spatial microscopy (raummicroscopie). Basing his investigations on more than 1,600 staining experiments and a critical study of the literature, he concludes that successful staining with methylene blue is due not to the excess or presence of oxygen or to alkalosis but to a prevalence of hydrogen and acidity; that the carbohydrates are the chief source of hydrogen, without which the staining with methylene blue cannot succeed. This dye causes a chain of chemical phenomena in the tissues—transformation of aldehydes into acids, splitting of the carbohydrates and combustion of organic acids. By adding to the solutions of methylene blue chemicals such as dextrose, phenol, hedonal, magnesium chloride and magnesium bromide, Schabadasch has succeeded in obtaining excellent results in cases in which staining with the classic method ordinarily fails. The brilliant success of the modifications of Ehrlich's method and the correctness of the premises on which Schabadasch has based them he demonstrates in twenty-

1. A brief description of the macromicroscopic method appeared in a review of Worobiew's Methodik der Untersuchungen von Nervenelementen des makro- und makro-mikroskopischen Gebietes, J. A. M. A. **86**: 1647 (May 22) 1926.

2. Schabadasch, Arnold: Acta morphologica: Arbeiten aus dem morphologischen Laboratorium der Filiale des Institutes für experimentelle Medizin (Wiem) und dem staatlichen anatomischen Institut in Gorkij (Ud. S. S. R.); Theoretische und experimentelle Studien zur Methylenblaufärbung des Nervengewebes, State ed., Gorkij, 1935.

three excellent photomicrographs illustrating such networks as Auerbach's plexus myentericus, Meissner's plexus subserosus, and the intramural nerve network in the dog's uterine wall and the urinary bladder. The monograph by Schabadasch is unquestionably an important scientific contribution and a credit to the scientists of the Soviet Union.

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# *Medical News*

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

## CALIFORNIA

**Bill Introduced.**—A. 51 authorizes the board of supervisors of a county maintaining a county hospital to admit pay patients to the county hospital and to charge such patients for the entire value of the services rendered to them, as ascertained pursuant to rules and regulations promulgated by the board. Payment is to be adjusted to the patient's ability to pay. Such patients are to receive medical, surgical or other treatment from qualified physicians of their own choice.

**Society News.**—Dr. Clarence M. Hyland, Los Angeles, addressed the San Diego County Medical Society, January 12, on "Use of Convalescent Serum in Contagious Diseases."——Dr. Rosco G. Leland, director, Bureau of Medical Economics, American Medical Association, Chicago, addressed the Los Angeles County Medical Association, January 21, on medical economics. Several changes in the society's bulletin, effective with the January 7 issue, include an increase in size and an improved cover page.——The Alameda County Medical Association was addressed, January 18, by Drs. Harry J. Templeton on "The Evolution of Cutaneous Epitheliomas"; Olin H. Garrison, "Use of Protamine Insulin," and Albert H. Rowe, "Clinical and Experimental Allergy." All are from Oakland.

## GEORGIA

**Health Departments Merge.**—The health department of Americus and the Sumter County Health Department merged, January 1. Dr. William Franklin Castellow, Montgomery, Ala., is the new health officer. He succeeds Dr. Abram J. Davis, resigned. Dr. Davis held the titles of city and county health officer.

## ILLINOIS

**Outbreak of Smallpox.**—Fifteen cases of smallpox were reported in an outbreak at Beardstown and five at Meredosia, according to the state department of health, January 16. The first case at Beardstown was thought to be chickenpox and this error in diagnosis is believed responsible for the spread of the outbreak. All unvaccinated children have been prohibited from attending schools in Beardstown, and similar recommendations have been made to Meredosia. Vigorous vaccination campaigns are being urged by the department.

### Chicago

**Medical School Shares in Rockefeller Gift.**—The General Education Board of the Rockefeller Foundation has given to the University of Chicago $3,000,000 for the development of the medical school and the improvement of the university generally. Of $360,000 to be devoted to medicine, $250,000 continues present grants. The remainder will finance thirty-six beds in Billings Hospital which have already been converted to free beds and ten additional free beds added in the Bobs Roberts Hospital for children through immediate use of the funds. With the increase in beds, 218 of the 519 beds in the various hospitals in the University Clinics will be entirely free. This figure of 218 beds does not include part pay beds or those used as free beds because of special circumstances, although designated as being for paying patients. According to the university, 47.69 per cent of the work done in the clinics in November was free, and this percentage represents the usual average of unpaid service provided. The establishment of the University of Chicago Clinics and medical laboratories, which were formally opened in 1927, was made possible largely through the assistance of the General Education Board.

**Society News.**—The German Medical Society of Chicago was addressed December 8 by Drs. William C. Beck on "The Recognition and Management of Peripheral Arterial Disease" and Samuel Perlstein, "The Electrocardiogram as an Aid in Clinical Medicine."——The Chicago Gynecological Society was addressed, January 15, by Drs. Henry Close Hesseltine on "Experimental and Clinical Therapy of Vulvovaginal Mycosis"; Herbert E. Schmitz, "Mortality and Complications of 3,129 Supracervical Hysteromyomectomies," and Edwin J. DeCosta and Ralph A. Reis, "The Oral Administration of Paraldehyde for Relief of Pain During Labor."——The Chicago Medical Society was addressed, January 20, by Drs. Clarence A. Earle on "Scarlet Fever Prevention"; Louis Rudolph, "Constriction Ring Dystocia," and Edward H. Ochsner, "Treatment of Simple Sprains."——Dr. Theodore Cornbleet, among others, addressed the Chicago Pathological Society, January 11, on "The Rôle of Calcium in Scleroderma."——The Chicago Council of Medical Women held a joint meeting with the Medical Women's Club, January 13; the speakers included William S. Peterson, Ph.D., on "The Patient and the Weather"; Marian Hood, "Amebiasis with Demonstration of Living Parasites," and Dr. Marie L. Connelly, "Changes Occurring in Hodgkin's Disease."

## INDIANA

**Bill Introduced.**—H. 2, to amend the workmen's compensation act, proposes to extend to sixty days from thirty days the period following an industrial accident during which an employer must pay for medical, hospital and nursing care rendered an injured workman. The bill also proposes to authorize the industrial board to require an employer to furnish such treatment for an additional period not exceeding sixty days, if by reason of the nature of the injury or the process of recovery treatment is necessary for such period.

## MASSACHUSETTS

**New Medical Editor.**—Dr. Robert N. Nye, Boston, has been appointed editor of the *New England Journal of Medicine* to succeed Dr. Walter P. Bowers, who has been managing editor since April 1921. Dr. Nye is 44 years of age and a graduate of Harvard University Medical School, class of 1918. For several years he has been assistant pathologist in charge of bacteriology in the pathologic laboratory of the Boston City Hospital.

**University News.**—Frederick C. Waite, Ph.D., professor of histology and embryology, Western Reserve University School of Medicine, Cleveland, addressed the George A. Bates Society, composed of faculty and students of Tufts College, January 8, on "The Background of Dentistry." He also addressed the Association for the Promotion of University Education in Dentistry in Boston, January 9-10, on "Development of Dentistry in the United States in the Nineteenth Century."

**Students' Health at Harvard.**—A total of 1,463 students, or 20 per cent of the student body, were admitted to Stillman Infirmary of Harvard University, Boston, during the year 1935-1936, according to the first annual report of the recently reorganized department of hygiene. This number spent an average of 3.9 days in the infirmary, while 211 men who were admitted to hospitals spent an average of 12.6 days. There were 28,843 visits made to the various branches of the department of hygiene, but medical excuses from classes were given to only 2,709, representing, it was stated, a considerable reduction from the numbers in former years. The majority of infirmary patients were treated for "acute respiratory infections" under the designation of colds, while sixty-six hospital patients, or 41 per cent, had operations for appendicitis. An additional 15 per cent of the students were sent home to bed. Skiing was responsible for more serious accidents than any other sport, there being recorded a fracture of the femur, two fractures of both bones of the lower leg and one fracture of two vertebrae. Two fractures of the lower leg incurred in hockey and baseball were the only other two serious athletic accidents. Football was responsible for one serious injury, a fractured clavicle.

## MICHIGAN

**Personal.**—Drs. John W. Hawkey, Santa Ana, Calif., and Alois Thuner, Point Loma, Calif., have been elected members emeritus of the Michigan State Medical Society.

**Physician Honored.**—Dr. Archibald D. MacLaren, Port Huron, was guest of honor at a dinner given by the St. Clair County Medical Society January 5. Dr. Howard O. Brush, president of the society, was toastmaster, and Dr. Henry Cook, Flint, president-elect of the state medical society, was among

the speakers. Of sixty-two years in the practice of medicine, Dr. MacLaren has spent forty-nine in Port Huron. He is 87 years of age. According to the announcement, he served the community as police commissioner in 1900 and later as health commissioner. He graduated from the Long Island College of Medicine in 1876.

**State Society Night.**—The Monroe County Medical Society observed a "state society night" at its meeting at the Monroe Country Club, December 17. The following program was presented:

Dr. Louis Fernald Foster, Bay City, secretary of the Michigan State Medical Society, Greater County Society Activity and Organization.
Dr. Paul R. Urmston, Bay City, chairman of the council of the state society.
Mr. William J. Burns, Lansing, executive secretary of the state society, What Your State Society Is Doing for You.

In a discussion of "What the Next Legislature Means to the Practitioner of Medicine," Dr. Howard H. Cummings, Ann Arbor, councilor of the fourteenth district, considered the basic science bill; Dr. Philip A. Riley, Jackson, vice speaker of the house of delegates of the state society, the physician's responsibility, and Dr. Leo G. Christian, Lansing, chairman of the state legislative committee, other legislative issues of importance to the physician.

## MINNESOTA

**Society News.**—The Red River Valley Medical Society devoted its meeting, December 8, to a discussion of medical economics; the speakers were Drs. William W. Will, Bertha, president of the state medical association; Willard L. Burnap, Fergus Falls, councilor of the eighth district, and Mr. R. R. Rosell, St. Paul, assistant to the secretary of the state association, Dr. Edward A. Meyerding.——Dr. William D. Beadie, medical director and superintendent of Mineral Springs Sanatorium, Cannon Falls, was the guest speaker before the Rice County Medical Society in Faribault, December 9.

**Fifty Years of Service.**—Dr. Jacob C. Rothenburg, Springfield, was guest of honor at a banquet, December 15, given by the Springfield Booster Club in recognition of his completion of fifty years in the practice of medicine. Speakers included Drs. Walter G. Nuessle, Springfield, and George B. Weiser, New Ulm. Mr. Fred W. Johnson, president and founder of the Brown County Historical Association, presented an account of the early physicians of the county. Dr. Rothenburg is 76 years of age and a graduate of the University of Michigan Department of Medicine and Surgery, Ann Arbor, class of 1885.

**Director of Student Health Service Appointed.**—Dr. Ruth E. Boynton, associate professor of preventive medicine and public health, University of Minnesota Medical School, Minneapolis, has been appointed director of the student health service of the university. Dr. Boynton succeeds Dr. Harold S. Diehl, who was appointed dean. She graduated from Minnesota in 1921 and became director of the division of child hygiene, state board of health, in 1923. This position she held until 1927, when she went to the University of Chicago Medical School as assistant clinical professor of medicine; she was also connected with the student health service there. In 1928 she was appointed to the associate professorship at Minnesota.

## MISSOURI

**Medicolegal Committee.**—The St. Louis Medical Society has appointed a medicolegal committee with the following members: Drs. Max J. Bierman, chairman, and Paul R. Nemours and Edward J. Helbing. The committee is appealing not only to members of the state association in St. Louis but to physicians throughout the state for funds to finance its activities.

**Lectures on Cancer.**—At a meeting of the Buchanan County Medical Society in St. Joseph, January 6, Drs. Ferdinand C. Helwig and Charles Edgar Virden, Kansas City, discussed "Diagnosis and Treatment of Cancer of the Rectum" and "Roentgen-Ray Diagnosis of Diseases of the Colon" respectively.——The St. Charles County Medical Society will be addressed February 2 by Drs. Edwin C. Ernst and Warren R. Rainey, St. Louis, on "Roentgen-Ray Aid in the Diagnosis and Treatment of Diseases of the Colon" and "Cancer of the Rectum" respectively. These lectures are presented under the auspices of the cancer committee of the state medical association.

**Society News.**—Dr. Harry J. Corper, Denver, addressed the Kansas City Academy of Medicine, December 18, on "Recent Advances in the Pathology of Tuberculosis."——At a meeting of the Adair-Knox-Schuyler-Sullivan Counties Medical Society in Kirksville, December 4, Dr. Edward S. Smith, Kirksville, discussed dysentery.—The Dallas-Hickory-Polk Counties Medical Society was addressed in Buffalo December 1 by Drs. Francis T. H'Doubler, Springfield, on "Diagnosis, Differential Diagnosis and Treatment of Gallbladder Disease and Its Associated Biliary System"; Elmer E. Glenn, Springfield, "The Heart Patient a Surgical Risk," and Horace G. Savage, Warsaw, "True Bronchial Asthma."——Jacques J. Bronfenbrenner, Dr.P.H., professor of bacteriology and immunology, Washington University School of Medicine, addressed the Trudeau Club of St. Louis, January 7, on "Immunology in Tuberculosis."

## NEBRASKA

**Practitioners Honored for Fifty Years of Practice.**—Dr. John W. King, Hartington, was the guest of honor at a dinner given by the Cedar-Dakota-Dixon-Thurston-Wayne Counties Medical Society at Wayne, December 10, in celebration of his completion of fifty years of medical practice. Dr. Charles T. Ingham, Wayne, was toastmaster and Dr. Lucien Stark, Norfolk, was the principal speaker. The society presented a clock to Dr. and Mrs. King. Dr. King graduated from the Detroit College of Medicine in 1886. He has practiced in Hartington for forty-five years.——Dr. Allen H. Hostetter, Douglas, received a service award at a joint banquet of the Nebraska City Rotary Club and the Otoe County Medical Society, November 18. Dr. Benjamin F. Bailey, Lincoln, was the principal speaker. Dr. Hostetter is a native of Indiana and a graduate of Rush Medical College, Chicago, class of 1886.

## NEW HAMPSHIRE

**New State Health Officer.**—Dr. Travis P. Burroughs, health officer of Concord, has been appointed secretary of the state board of health to succeed the late Dr. Charles Duncan. Dr. Burroughs is a native of Missouri and 41 years old. He graduated from the University of Missouri in 1917 and from Harvard University Medical School in 1925. He served an internship at Albany Hospital, Albany, N. Y., and lived in several New York towns before coming to Concord.

## NEW YORK

**Hundredth Anniversary of County Society.**—The Chemung County Medical Society recently celebrated the one hundredth anniversary of its founding with a dinner meeting at the Hotel Mark Twain, Elmira. Dr. Floyd Winslow, Rochester, president of the Medical Society of the State of New York, was a guest, discussing social problems confronting the medical profession. Dr. Arthur W. Booth, Elmira, a trustee of the American Medical Association, reviewed the history of the society; Dr. Ross G. Loop described methods and treatments used by physicians during the past hundred years, and Dr. Anna M. Stuart told of women physicians in the society's history. Dr. Reeve B. Howland displayed an exhibit of instruments and pictures of former physicians of the county. The program closed with a playlet written by Dr. Booth, "The Doctor's Dream," and played by Drs. Deborah M. H. Wyttenbach, Charles L. Stevens, Joseph S. Lewis, LaRue Colegrove, Lawrence L. Hobler and Reeve Scott Howland.

### New York City

**Laboratory for Diagnosis of Tropical Diseases.**—The department of hospitals has established at Bellevue Hospital a laboratory for tropical and subtropical diseases, which have been found to be common especially among the foreign population of New York. Dr. Douglas Symmers, general director of laboratories of the department of hospitals, will have supervision of the laboratory and in immediate charge will be Drs. Harry Most and Amanda Hoff. The laboratory is prepared to study peculiar forms of malaria, hookworm and other intestinal parasites, leprosy, yaws, sprue, Delhi boil, Maduro foot, Bilharzia and related fluke diseases, beriberi, Peruvian wart disease, amebic and bacillary dysentery and trachoma.

**Symposium on Care of the Mentally Ill.**—The division of psychiatry of the department of hospitals held a symposium on care of the mentally ill in the psychiatry building at Bellevue Hospital, December 16. Representatives of social, legal and medical agencies of the state and city attended the symposium, the purpose of which was to promote cooperation between the agencies and the city's hospital service. On the program were Drs. Sigismund S. Goldwater, commissioner of hospitals; Samuel W. Hamilton, White Plains, N. Y., who discussed "Psychiatric Care in New York City"; Karl M. Bowman, director of the division of psychiatry at Bellevue, activities of the division, and Mr. Stanley P. Davies, general director of the Charity Organization Society, "Psychiatry from the Standpoint of Social Agencies."

**Position Open for Director of Social Hygiene Bureau.**—The Municipal Civil Service Commission of New York announces an examination to be held for the position of director of the bureau of social hygiene in the New York City Department of Health. The preliminary requirements are graduation from an accredited medical school, five years' administrative work of which two must have been in venereal disease control, and a license to practice in New York before certification for the appointment. The appointee will carry out the department's program for control of syphilis and gonococcic infection, maintain working relations with hospitals and social agencies, direct record keeping, develop plans for control of venereal disease and direct popular health work in prevention. Applications will be received until February 15 at Room 1400, Municipal Building, Manhattan.

## NORTH DAKOTA

**Society News.**—At a meeting of the sixth district of the North Dakota State Medical Association in Bismarck, December 1, a symposium on respiratory diseases was presented by Drs. Willis B. Shepard, Linton, Florian E. Schmidt, Chicago, and Charles W. Schoregge, Bismarck. Dr. George M. Constans, Bismarck, was elected president of the district society.

## OHIO

**University News.**—Dr. Louis N. Katz, Chicago, gave a lecture at an open meeting of the Western Reserve University chapter of Sigma Xi, November 24, on "The Genesis of the Electrocardiogram."

**Dr. Corlett Endows Room for Dermatologists.**—Dr. William T. Corlett, professor emeritus of dermatology, Western Reserve University School of Medicine, Cleveland, has furnished and endowed a room in the Cleveland Medical Library dedicated to research in dermatology and syphilology. Dr. Corlett has given his library, which is said to contain many rare items in several languages, and has placed in the room the mahogany furniture used in his office before his retirement. There are also portraits and busts of famous figures in the history of dermatology. Dr. Corlett, now 82 years old, retired from the faculty of Western Reserve in 1924.

**Public Health Lectures in Cincinnati.**—Dr. William W. Bauer, director of the Bureau of Health and Public Instruction, American Medical Association, Chicago, will give the first lecture in the annual series for the public sponsored by the Academy of Medicine of Cincinnati and the University of Cincinnati College of Medicine. Dr. Bauer will speak January 24 on "What You Should Know About Your Health." Later lectures will be presented by Drs. Dennis E. Jackson, professor of pharmacology and Edward Wendland, professor of materia medica and therapeutics at the university, on "Drugs —Good and Bad"; Robert A. Kehoe, associate professor of physiology, "Industrial Poisons," and Marion A. Blankenhorn, professor of medicine, "The Importance of an Adequate Diet."

## PENNSYLVANIA

**Bill Passed.**—S. 15, to amend the state constitution so as to prohibit the legislature from making appropriations for charitable, educational or benevolent purposes to any person or community or to any denominational or sectarian institution, has passed the Senate. Such an amendment would affect many private hospitals.

**Personal.**—Dr. James Evans Scheehle, Llanerch, has been appointed coroner of Delaware County. Dr. Scheehle resigned several months ago as state secretary of welfare after serving since January 1935.——Dr. George W. Kehl, chief in surgery on the staff of Reading Hospital for ten years, was honored at a testimonial dinner recently given by his co-workers at the hospital on his retirement. Dr. Pascal Brooke Bland, Philadelphia, was the principal speaker. Dr. Kehl was graduated from the University of Pennsylvania Department of Medicine in 1893 and has been associated with the hospital since 1913. He has been made consulting surgeon.

**Graduate Assembly at Danville.**—A graduate assembly was presented at Geisinger Memorial Hospital, Danville, December 11, under the auspices of the Montour County Medical Society. An operative clinic opened the program, followed by papers given by staff members and by the following guest speakers:

Dr. William O'N. Sherman, Pittsburgh, Treatment of Acute Traumatism.
Dr. Charles Bagley Jr., Baltimore, Injuries to the Head and Brain.
Dr. William J. Merle Scott, Rochester, N. Y., Practical Surgical Applications of Our Knowledge Concerning the Sympathetic Nervous System.
Dr. Sumner L. S. Koch, Chicago, Infections of the Hand.

**Bills Introduced.**—S. 7, to supplement the workmen's compensation act, proposes to make disabilities resulting from a number of stated occupational diseases compensable, among which are poisoning by lead, mercury, phosphorus, arsenic, methanol, carbon bisulfide, naphtha, volatile halogenate hydrocarbons, manganese dioxide, brass, zinc, benzol (benzene) and nitro- and amido-derivatives of benzol; compressed air illness; destruction of tissue by radium or x-rays; chrome ulceration; epitheliomatous cancer or ulceration of the skin or of the corneal surface of the eye resulting from the handling or use of tar pitch, bitumen, mineral oil or paraffin; infection or inflammation of the skin resulting from the handling or contact with oils, cutting compounds, lubricants, dusts, liquid fumes, gases or vapors; anthrax; silicosis, and chronic incapacitating miners' asthma. H. 26 proposes an amendment to the state constitution which would authorize the legislature to classify charitable, educational, benevolent, denominational or sectarian institutions and to appropriate money to such of them as render aid to indigent, diseased, infirm or disabled persons. H. 40, to amend the workmen's compensation act, proposes (1) to extend to one year, from thirty days, the period following an industrial accident during which an employer must pay for medical and hospital care rendered his injured worker, (2) to eliminate the provision in the present law which limits the employer's liability for such services to $100 and (3) to authorize the injured worker to select his own physician to treat him at the employer's expense.

### Philadelphia

**University News.**—Temple University will confer the honorary degree of doctor of science on Dr. José Arce, dean of the faculty of medicine, University of Buenos Aires, Argentina, at its Founders' Day exercises February 15.

**Personal.**—Dr. Alexander E. Burke has been appointed a member of the State Board of Medical Education and Licensure to succeed Dr. Arthur C. Morgan, whose term expired. ——Dr. Frederick S. Baldi was elected president of the Medical Club of Philadelphia at its annual meeting January 15, at the Bellevue-Stratford.

**Scholarships at College of Pharmacy.**—The alumni association of the Philadelphia College of Pharmacy and Science sponsors seven scholarships annually to defray expenses of the freshman year in courses at the college leading to the baccalaureate degree in biology, chemistry, pharmacy and bacteriology. An entrance examination will be held at the college February 13 in mathematics, science and English and will include an aptitude test. Application blanks may be obtained from the registrar of the college.

### Pittsburgh

**Society News.**—Dr. Ralph R. Mellon addressed the Allegheny County Medical Society, January 19, on "Recent Chemotherapeutic and Serological Advances in the Treatment of Hemolytic Streptococcal Infections."——Dr. Abraham Levinson, Chicago, addressed the annual scientific meeting of the Pittsburgh Medical Forum, January 16, on "Cerebrospinal Fluid."

## SOUTH CAROLINA

**Society News.**—Dr. William B. Lyles, Spartanburg, was elected president of the South Carolina Urological Association at the annual meeting December 8. The guest speakers were Drs. Leon Herman, Philadelphia, and William Baird Stuart, Carlisle, Pa.——Dr. William Weston Sr., Columbia, was elected president of the South Carolina Pediatric Society at its annual meeting in Columbia, December 1. The guest speaker was Dr. Charles Armstrong of the U. S. Public Health Service, Washington, D. C., on prevention of anterior poliomyelitis.

**State Health Officer for Twenty-Five Years.**—Members of the staff of the state department of health presented to Dr. James A. Hayne, Columbia, state health officer, a gold watch at Christmas in recognition of his completion of twenty-five years in that position. Dr. Hayne was graduated from the Medical College of the State of South Carolina, Charleston, in 1895 and practiced for several years before becoming health officer. He has been president of the South Carolina Medical Association and of the Conference of State and Provincial Health Authorities of North America and chairman of the Section on Preventive and Industrial Medicine and Public Health of the American Medical Association and of the public health section of the Southern Medical Association. Three sons of Dr. Hayne have become physicians: Drs. James A. Hayne Jr., Isaac Hayne, Congaree, and Theodore B. Hayne, who died of yellow fever while engaged in research in Africa.

## TEXAS

**Hospital News.**—Dr. Barton W. Dorbandt, assistant superintendent of the San Antonio State Hospital, has been appointed superintendent of the Wichita Falls State Hospital. He succeeds Dr. Charles W. Castner, who has been made head of all state eleemosynary institutions, according to newspaper reports. —— The Thompson Sanatorium, Kerrville, has been sold to the state to be used as a state hospital for Negroes with tuberculosis.

**Society News.**—Drs. Milford O. Rouse and Curtice Rosser, Dallas, addressed the Brown-Mills County Medical Society, December 14, on "Diagnosis and Treatment of Constipation, Irritable Colon, Fermentative Diarrhea and Nervous Indigestion" and "Management of Minor Anorectal Conditions" respectively.——The North Texas Medical Association held its semiannual meeting in Dallas December 8-9. Among the speakers were Drs. Leroy D. Long, Oklahoma City, on diseases of the thyroid gland, and Oliver C. Melson, Little Rock, Ark., on diagnosis of blood dyscrasias.——Dr. John T. Moore, Houston, addressed the Liberty-Chambers Counties Medical Society, December 10, on "Carcinoma of the Cervix."

**Graduate Assembly in San Antonio.** — The fifth annual clinical meeting of the International Postgraduate Medical Assembly of Southwest Texas will be held in San Antonio, January 26-28, with headquarters at the St. Anthony Hotel. The activities will include general meetings morning and afternoon, section luncheon meetings and evening assemblies the first two days. The guest speakers will be Drs. Albert M. Snell, Rochester, Minn., medicine; Frederick J. Taussig, St. Louis, obstetrics and gynecology; Samuel W. Becker, Chicago, dermatology; Manuel Martínez Baez, Mexico City, medicine; John M. T. Finney, Baltimore, surgery; Fremont A. Chandler, Chicago, orthopedic surgery; Albert C. Furstenberg, Ann Arbor, Mich., otolaryngology; Julius H. Hess, Chicago, pediatrics; Cecil S. O'Brien, Iowa City; William C. Quinby, Boston, urology; Alfonso Ortiz Tircedo, Mexico City, orthopedic surgery, and Ignacio Gonzales Guzmán, Mexico City.

## UTAH

**State Mental Hygiene Meeting.**—Dr. Alfred A. Robinson, Ogden, was elected president of the Utah State Society for Mental Hygiene at a meeting in Salt Lake City December 18. The guest speaker at the meeting was Dr. Charles A. Rymer, assistant director of the Colorado Psychopathic Hospital and assistant professor of psychiatry, University of Colorado School of Medicine, Denver.

## VIRGINIA

**Society News.**—Dr. Edwin C. Hamblen, Durham, N. C., addressed the Halifax County Medical Society, December 11, on "Treatment of Functional Uterine Bleeding."——Dr. Nelson B. Sackett, New York, addressed the Norfolk County Medical Society, November 30, on carcinoma of the uterus.

**Special Committees on Pneumonia and Syphilis.**—The president of the Medical Society of Virginia, Dr. James Morrison Hutcheson, Richmond, has announced the appointment of two new committees, among others. A pneumonia commission to investigate the incidence and types of the disease in Virginia and the kind of management in vogue includes Drs. Wyndham B. Blanton, Richmond, chairman; Walter B. Martin, Norfolk; Henry B. Mulholland, Charlottesville; Philip S. Smith, Abingdon, and Harry Walker, Richmond. Pursuant to a request from the surgeon general of the U. S. Public Health Service, a committee to deal with the problem of syphilis control has been appointed, consisting of Drs. Ennion S. Williams, Richmond, chairman; Raymond DeV. Kimbrough, Norfolk; Edwin E. Barksdale, Danville, and Dudley C. Smith, Charlottesville.

## WEST VIRGINIA

**Conference of Secretaries.**—The annual conference of secretaries of county medical societies was held at the headquarters of the West Virginia Medical Association in Charleston, January 12. Among those who were to lead discussions were Drs. William S. Fulton, Wheeling, president of the state association; Benjamin H. Swint, Charleston, chairman of the association's advisory committee on social security; Berlin B. Nicholson, secretary of the Academy of Medicine of Parkersburg, and Thomas H. Blake, Charleston, of the state health department.

**Society News.** — Dr. Louis G. Herrmann, Cincinnati, addressed the Cabell County Medical Society in Huntington, December 10, on "Peripheral Vascular Diseases." —— Dr. Charles H. Gay, Martinsburg, and Mr. Joe W. Savage, executive secretary of the West Virginia Medical Association, addressed the Eastern Panhandle Medical Society in Martinsburg, on "Diseases of the Kidney in Infants and Children" and economic problems peculiar to West Virginia.——Dr. Benjamin P. Potter, Secaucus, N. J., addressed the Kanawha Medical Society, Charleston, December 8, on "Tuberculosis from a General Practitioner's Point of View." —— Dr. Willis C. Campbell, Memphis, Tenn., addressed the Ohio County Medical Society, Wheeling, January 7, on "Physiologic Principles Applied to the Treatment of Fractures."——At a meeting of the Raleigh County Medical Society, Beckley, December 17, Dr. Archer A. Wilson, Charleston, spoke on injuries to the head.

## PUERTO RICO

**Personal.** — Lucy G. Taliaferro, Sc.D., and William H. Taliaferro, Ph.D., Chicago, will be at the School of Tropical Medicine of the University of Puerto Rico, for the coming three months conducting research on the mechanism of immunity to trichiniasis, a joint project of the University of Chicago and the School of Tropical Medicine. Dr. William H. Taliaferro is dean of the Division of Biological Sciences at Chicago. ——Dr. Honorio F. Carrasquillo, Utuado, has been appointed a member of the board of medical examiners.

## GENERAL

**Annual Social Hygiene Meeting.**—The annual meeting of the American Social Hygiene Association will be held at the Hotel Pennsylvania, New York, February 3. The subject of discussion will be "Controversial and Unsettled Questions of Procedure and Public Policy Relating to Programs for the Control of Syphilis and Gonorrhea," and the speakers announced are Drs. Charles Walter Clarke, New York; John F. Mahoney of the U. S. Public Health Service; Henry P. Talbot, Hartford, Conn., and Charles V. Craster, Newark, N. J., and Mr. Alan Johnstone, formerly regional director for law enforcement and protective measures, Army and Navy Training Camp Commissions. Dr. Ray Lyman Wilbur, Stanford University, Calif., and Dr. Thomas Parran, surgeon general, U. S. Public Health Service, will make the introductory addresses and Dr. William F. Snow, general director of the association, will preside.

**Society News.**—Officers of the section on medical sciences (N) of the American Association for the Advancement of Science, elected at the recent meeting in Atlantic City, are Dr. Esmond R. Long, Philadelphia, chairman and a vice president of the association, and Malcolm H. Soule, LL.D., Ann Arbor, Mich., secretary. Forest R. Moulton, Ph.D., formerly professor of astronomy at the University of Chicago, was elected permanent secretary of the association to succeed Henry B. Ward, LL.D., emeritus professor of zoology at the University of Illinois, Urbana.——The American Orthopedic Association will hold its annual meeting in Lincoln and Omaha, Neb., June 2-4.——The annual meeting of the American Heart Association will be held February 1 at its headquarters at 50 West Fiftieth Street, New York.——The American College of Physicians will hold its annual meeting in St. Louis, April 19-23.

**Influenza and Pneumonia.**—Eighty-six major cities of the United States reported to the U. S. Department of Commerce 11,401 deaths during the week ended January 9. This figure is a decided increase over the average number for the corresponding week of the past three years, 9,628, and over the numbers reported for the five preceding weeks, as shown in the following table:

| | | | |
|---|---|---|---|
| January 9 | 11,401 | December 19 | 9,247 |
| January 2 | 10,419 | December 12 | 8,790 |
| December 26 | 8,548 | December 5 | 8,743 |

The Department of Commerce attributes the excessive mortality to the prevailing epidemic of influenza and pneumonia. The report points out that certain considerations must not be overlooked in the interpretation of these reports. Weekly figures fluctuate widely; some cities are hospital centers for large areas outside the city limits, and the sex, age and racial composition of the cities is not always comparable.

**Certificates for Veteran Public Health Members.**—Eight members who have been affiliated with the American Public Health Association forty years or more were presented with certificates at the recent annual meeting of the association in New Orleans. Dr. John Harvey Kellogg, head of the Battle Creek Sanitarium, Battle Creek, Mich., and Daniel W. Mead, Madison, Wis., received their certificates in person, but the others were unable to attend. Dr. Mazÿck P. Ravenel, Columbia, Mo., received the certificate for Dr. William C. Woodward, Chicago, Director, Bureau of Legal Medicine and

Legislation, American Medical Association; Dr. Henry D. Chadwick, Boston, for Mr. Robert Spurr Weston, Boston; Henry F. Vaughan, Dr.P.H., Detroit, for George A. Soper, Ph.D., Great Neck, N. Y.; Dr. Angel de la Garza Brito for Dr. Jesús E. Monjaras, Mexico City; Dr. Clarence L. Scamman, New York, for Dr. Charles V. Chapin, Providence, R. I., and Carl E. Buck, Dr.P.H., New York, for Marion Talbot, Chicago.

**Scholarship Available for Boys' Preparatory School.**—The trustees of St. Mark's School, Southborough, Mass., wish to bring to the attention of the medical profession three scholarships to be awarded for boys to enter school next September. Applications for the scholarships will be received at once and should be made by March 1. The examinations will be for the most part of the objective type, for which no special preparation is necessary or desirable, according to the announcement. The school record of the candidate, personal testimony of teachers and others and, wherever possible, personal interviews with a representative of the school will be important factors in the selection. The successful candidates will be expected to meet the usual entrance requirements, taking the entrance examinations in June as follows: for the first form (seventh grade): English and arithmetic; for the second form (eighth grade), English, arithmetic and algebra; for the third form (ninth grade), English, algebra, Latin and French. Further details may be obtained from the Headmaster, St. Mark's School, Southborough, Mass.

**Survey of Research in Mental Hospitals.**—Dr. Winfred Overholser, formerly commissioner of the Massachusetts State Department of Mental Diseases, Boston, has been appointed director of the division of mental hospital research of the National Committee for Mental Hygiene, New York. Dr. Overholser will direct a national survey, it is reported, to ascertain the extent of research being made in institutions for the care of the mentally ill and to find new research clues worthy of development. An advisory committee will be appointed for the survey. Dr. Overholser, a native of Massachusetts, graduated from Boston University School of Medicine in 1916. Until 1924 he served at the Evans Memorial Hospital, and the Westborough, Gardner and Medfield state hospitals. From 1925 to 1930 he was director of the division for the examination of prisoners and was assistant commissioner from 1930 until 1934, when he became commissioner. He taught psychiatry at Boston University School of Medicine for several years and has been lecturer at the Boston University School of Law since 1929. He served as consultant to the National Crime Commission and as chairman of the committee on delinquents and prisons of the First International Congress of Mental Hygiene. He has been a member of the Committee on Psychiatric Jurisprudence of the American Medical Association since 1929. He is a past president of the Massachusetts Psychiatric Association and, in 1936, was president of the New England Society of Psychiatry.

**Medical Bills in Congress.**—*Changes in Status:* H. Res. 60 has passed the House, providing for the appointment of a Select Committee on Government Organization to which will be referred all bills and resolutions introduced in the House concerning reorganization, coordination, consolidation or abolition of organizations or units in the government. H. J. Res. 81 has passed the House, proposing to create a joint congressional committee on government organization to investigate the organization and activities of the several units of the government with the view to determining whether any such units should be coordinated, consolidated, reorganized or abolished. *Bills Introduced:* S. 59, introduced by Senator Bulkley, Ohio, proposes to establish a Bureau of Veterans' Affairs in the Department of the Treasury with the Commissioner of Veterans' Affairs at the head of it, to abolish the Veterans' Administration and transfer its functions to such bureau, and to revise generally the laws relating to veterans. S. 85, introduced by Senator White, Maine, proposes to grant pensions to male nurses who served under contract between April 21, 1898, and Feb. 2, 1901. S. 115, introduced by Senator Lewis, Illinois, and S. 655, introduced by Senator Sheppard, Texas, propose, respectively, to add the name of Gustaf E. Lambert and the name of Roger P. Ames to those honored by the act recognizing the service rendered by Major Walter Reed in the discovery of the cause and means of transmission of yellow fever. S. 383, introduced by Senator Steiwer, Oregon, proposes that any veteran who is a citizen or resident of a state whose laws require a certificate of disability for tax exemption purposes to be signed by an officer of the Veterans' Administration shall, on application, be entitled to receive without cost an annual physical examination by a duly qualified physician designated or approved by the Administrator of Veterans' Affairs. S. 702, introduced by Senator Barkley and H. R. 2711, introduced by Representative Vinson, both of Kentucky, propose to create a Division of Water Pollution Control in the United States Public Health Service. H. Res. 7, introduced by Representative Daly, Pennsylvania, proposes to request the Administrator of Veterans' Affairs to submit to the House of Representatives a report respecting the naval hospital at Philadelphia, setting forth the facilities of the hospital, the extent of its use by veterans, the need for additional facilities for veterans at such hospital, and certain other facts. H. J. Res. 87, introduced by Representative Randolph, West Virginia, proposes to erect a memorial to Dr. Samuel Alexander Mudd, "in recognition of his unselfish services to his fellow men while being held a prisoner for a crime which he did not commit." H. R. 96, introduced by Representative Smith, Washington, proposes to provide a uniform rate of pension for unmarried Spanish-American War veterans without dependents while hospitalized, and to extend hospitalization to persons recognized as veterans of the Spanish-American War under laws in effect prior to March 20, 1933. H. R. 249, introduced by Representative Colden, California, proposes to construct a marine hospital at Los Angeles Harbor, Los Angeles. H. R. 1532, introduced by Representative Robsion, Kentucky, proposes to reestablish the presumptive service connection for disease or disabilities severed by the act of March 20, 1933. H. R. 1538, introduced by Representative Rankin, Mississippi, proposes to provide that in no event shall any person by reason of wilful misconduct be denied any of the service connected benefits under the laws providing relief for veterans of the World War if such misconduct did not interfere during service with the full performance of military or naval duty. H. R. 1622, introduced by Representative Celler, New York, proposes, among other things, to reestablish service connection for a disease, injury or death of a veteran that was severed by the act of March 20, 1933. H. R. 1949, introduced by Representative Lesinski, Michigan, proposes to adjust and equalize benefits for veterans and widows and dependents of veterans. H. R. 1959, introduced by Representative Rankin, Mississippi, proposes to provide increased pensions for veterans of the World War. H. R. 1967, introduced by Representative Taylor, Tennessee, proposes to reenact all laws granting pensions to veterans that were repealed by the act of March 20, 1933. H. R. 2308, introduced by Representative Cannon, Missouri, proposes to reenact all public laws granting medical and hospital treatment, domiciliary care, compensation and other benefits to veterans of the World War that were repealed by the act of March 20, 1933. H. R. 2528, introduced by Representative Welch, California, proposes to confer the benefits of hospitalization and the privileges of the Soldiers' Homes on persons who served in the quartermaster's corps or under the jurisdiction of the Quartermaster General during the war with Spain, the Phillippine insurrection or the China relief expedition. H. R. 2530, introduced by Representative Kennedy, Maryland, proposes to provide hospitalization for certain employees in the Bureau of Navigation and Steamboat Inspection of the Department of Commerce and for licensed local pilots of the United States. H. R. 2720, introduced by Representative Fulmer, South Carolina, proposes to authorize the Reconstruction Finance Corporation to make loans to certain hospitals. H. R. 2879, introduced by Representative McGroarty, California, proposes to erect an addition to the existing Veterans' Administration facility, San Fernando, Calif., such addition to consist of 200 beds for the treatment of tuberculous patients. S. 855, introduced by Senator Capper, Kansas, proposes to aid in alleviating the loss caused by sickness.

## Government Services

### Physicians Wanted for CCC Duty

The government is in need of a number of physicians to assist in the medical work of the Civilian Conservation Corps camps throughout the eighth corps area, which comprises Texas, Colorado, Oklahoma, Arizona and New Mexico. Applicants for these positions must be graduates of class A medical schools. If accepted, they will be given preference of assignments in any one of these five states. Physicians without dependents will receive for this work $200 a month and those having dependents will receive $265 a month. All inquiries in connection with application for a position in the Civilian Conservation Corps work in the eighth corps area should be addressed to the Surgeon, Headquarters Eighth Corps Area, Fort Sam Houston, Texas.

# Foreign Letters

## LONDON

*(From Our Regular Correspondent)*

Dec. 19, 1936.

### Social Service and the Weaklings

In the long letter to the *Times*, Lord Dawson has gone to the root of the problem of national health in its politicomedical aspects. He points out that years ago nature's method of selecting the fit was a high birth rate and high infant and adult death rates. Formerly weaklings in body and mind sank to a low economic level, lived precariously and were prone to elimination by diseases such as tuberculosis. Today, through our social services, they receive maintenance and increasing protection from the ravages of disease. The mortality from tuberculosis has been halved in the last twenty-five years. Further, these weaklings often propagate to the disadvantage of the race. This nugatory rendering of nature's rough method of elimination necessitates an alternative policy, which we have not thought out. It should comprise (1) plans to promote fitness during the period of rearing and development, (2) plans to secure that the most fit among youth, from wherever they derive, have every opportunity to get to the forefront, and (3) plans of special and kindly measures for dealing with the inherently unfit. Under the first policy much has already been done. As to the second policy, if the best in body and mind get to the front there will arise a group of leaders of youth who will determine standards and values, to the advantage of the nation economically and racially. From these standards and values and the deriving tastes will result a process of unconscious selective mating which will make for fit progeny. Social and educational services ought to be more selective, pushing forward the better and best while at the same time securing for simpler folk training suitable for their simpler spheres of usefulness. At the other end of the scale the fundamentally unfit youth should be given kindly though economical shepherding and elemental training.

Let us beware lest in our desire to be kind to the weaker brethren of today we are not more than unkind to all the brethren of tomorrow. It is relevant to consider the birth rate. During the fifty years 1880-1930 there was a decline in the crude birth rate of 54 per cent in England. The dominant cause is contraception, which is widely and increasingly practiced in all European countries. Its practice is more prominent among the more educated classes, but it has already reached the artisan class and is rapidly penetrating the classes that live by unskilled labor. One potent cause is the fall of the infant death rate from 172 to 57 per thousand births during the last ninety years. Formerly the death rate was the safety valve. But contraception can be misused and in some cases families are too small for the health of the mother. Fit citizens should more than replenish their own places. There is need for motherhood clinics where instruction should be available for all women from the age of 18 onward on sex relations, hygiene and pregnancy and how contraception should be practiced. The burden of our taxation is a deterrent to parenthood. The cost of the social services has increased enormously. This rose from $515,000,000 in 1925 to $1,060,000,000 in 1936. In 1941 it will be $1,500,000,000. Finally, the inherently unfit should be actively discouraged from reproduction. There are some 250,000 mental defectives in this country who are free to marry. Good nurture cannot be a makeweight against bad breeding.

### Articles by Physicians in the Lay Press

It is held in the profession that physicians should not contribute to the lay press articles which advertise them as practitioners. On the other hand, under certain circumstances it may be proper that physicians should write for the instruction of the public. Thus to define what may or may not be written is not an easy problem. Advice on the point has been asked of the head office of the British Medical Association, which devotes a section in the *British Medical Journal* to "Problems in Practice," matters of general interest on which individual members seek advice. The official pronouncement is as follows: Topics which have a relation both to medical science and to the health and welfare of the public are discussed from time to time in the lay press. It may be legitimate and even advisable that physicians who can speak with authority on the question at issue should contribute to the discussion. But they ought to make it a condition of publication that laudatory editorial comments or headlines relating to the contributor's professional status or experience shall not be permitted, that his address or photograph shall not be published, and that there shall be no unnecessary display of his medical qualifications and appointments. It is pointed out that there is a special claim that practitioners of established position and authority shall observe these conditions, for their example must necessarily influence the actions of their less well recognized colleagues. Discussions on disputed points of treatment should be avoided. These find their appropriate medium in the professional societies and medical journals.

### Raw Vegetable Diet in Chronic Rheumatic Conditions

Von Noorden has used a raw vegetable diet in the treatment of chronic rheumatism and has attributed its value chiefly to salt restriction. This treatment has not been adopted in England to any extent. However, in her presidential address to the Section of Therapeutics of the Royal Society of Medicine Dr. Dorothy C. Hare reported a group of twelve cases treated by diet alone, so as to get clear-cut results. They comprised the main types of muscular rheumatism, osteo-arthritis and rheumatoid arthritis. The patients were admitted to the Royal Free Hospital (the London School of Medicine for Women). They were first placed for a week on the ordinary diet. If able, they were up and about for several hours daily and did voluntary exercises in the physical therapy department, where cinematograph records of their movements were made. The diet regimen was in two periods. The first lasted two weeks and in it the food was entirely uncooked. It averaged 2,000 calories daily and consisted of vegetables 14 ounces (salads, tomatoes, roots), citrus fruit 8 ounces (orange, lemon, grapefruit), apple 6 ounces, dried fruit 4 ounces (apricot, prunes, raisins), nuts 2 ounces, crushed oats three-fourths ounce (served after soaking), sugar one lump, salad oil or mayonnaise 2 ounces, 20 per cent cream 3 ounces, milk 12 ounces, no salt, and fluids (tea, water) unrestricted. These gave approximately the food values carbohydrate 145 Gm., protein 35 Gm., fat 143 Gm. After the two weeks the following cooked daily additions were made: vegetable soup, one egg, meat 2 ounces, bread 2 ounces and as uncooked additions butter 1 ounce, cheese 1 ounce and milk 20 ounces. No salt was added to that present in the food. Oil and cream were reduced as necessary. The approximate food values were carbohydrate 146 Gm., protein 66 Gm., fat 142 Gm., calories 2,200. This second diet was given for weeks or months.

Of the twelve patients eight felt definitely better within one to four weeks. Of the other four, two improved up to five or six weeks and then relapsed, and two found no relief at all. The improvement consisted of decrease of pain, stiffness and swelling (symptoms that arise in the soft tissues). Pain arising in joints with active disease of bone and toxic symptoms were not relieved. The cases of muscular rheumatism uncomplicated by definite arthritis gave the best response. Some improvement was seen on the fourth day, and after a fortnight the changes were sometimes striking. The effect was progres-

sive up to discharge and afterward. One patient, a saleswoman aged 49, had been unable to work for two years in spite of continuous physical treatments. After six weeks on the diet she resumed work and has continued without interruption for five months. The cinematograph records showed the stiff awkward movements before treatment and almost normal movements three or four weeks later.

Patients with rheumatoid arthritis obtained some relief of pain and stiffness at first, but the toxic symptoms remained apparently uninfluenced for many weeks. The only patient given continuous diet treatment for several months made a remarkable improvement. In a woman of 53 the disease had begun two years previously and was of the severe progressive type. All the joints were involved, the hips and knees most severely, and she had been unable to sit or move for six weeks before admission and cried with pain when moved in bed. X-ray examination showed only slight changes in the bones. There were toxic symptoms with wasting, sweating, occasional low fever and anemia. Under the diet she made slow progress, relief of pain preceding improvement in toxic symptoms. She gradually gained weight, and the fever and anemia improved. After the third month massage was given in addition to the diet. After six months she could shuffle a few steps on sticks and was free from acute pain.

Dr. Hare attributed the rapid effect to the low sodium intake. The sodium content of the vegetable foods being extremely small and no added salt being allowed, there was a rapid loss of tissue fluid. This caused a rapid fall of weight in the first week, though weight was gained on exactly the same diet in the following week. The fluid intake was not limited at any period. She referred to the recent work of R. A. McCance on sodium restriction, which appears to explain her results. The factor of abnormal retention of tissue fluids in chronic rheumatism has been emphasized by Ralph Pemberton. Undernutrition was not a factor in producing the results. She insisted on the importance of the addition of adequate protein and fat to the vegetable diet and thought the abundant supply of vitamin B and C of undoubted value.

### A British System of Physical Exercises

Great attention is now being given in this country to the problems of public health and physical efficiency. A team of boys from the Betteshanger School, Eastry, Kent, which has given demonstrations at a number of public schools, gave in London, before members of the Parents' Association, a display of a British system known as "basic physical training" because its movements are designed to provide a basis of physical development necessary to give balance, poise and fitness as a preliminary to the playing of games or further forms of physical culture. At Betteshanger School remedial exercises are first given to the boys who need them. Subsequently the course of training of each boy is divided into three sets of movements. The first consists of breathing exercises to secure full expansion and development of the lungs; the second, to teach correct posture and to remedy defects such as flat feet, weak abdominal muscles, spinal curvature and round shoulders; and the third, to give the fullest possible muscle control. Mr. Evans, the headmaster, explained that after examining physical training systems in the United States and Scandinavia he was induced to try a purely British system and found the results much superior to anything he had seen abroad. That system had been tried at Betteshanger and half a dozen other schools. If adopted on a national scale, it would put British boys and girls in the front rank for physique and fitness. In view of the national movement now taking shape to provide the nation with the best facilities for physical training, he was anxious that every system, including "basic physical training," should be examined before any attempt was made to standardize training in this country.

### The Nutrition of the People

The question of malnutrition continues to be a matter of political controversy. Sir Kingsley Wood, minister of health, received a deputation on the question from the Standing Joint Committee of Industrial Women's Organizations. He said that malnutrition was a word much used and much abused. The word was not, of course, solely concerned with lack of food, although it was an important factor. Sir John Orr (dietition) and other experts who advised the ministry were agreed that there was need for further investigation. The Ministry of Health's nutrition advisory committee was actively pursuing its work, and he had just arranged for a number of detailed dietary surveys to ascertain the consumption of various kinds of food by different households. Some investigations of this sort had already been made in industrial areas in the north of England. The milk in schools scheme was probably the largest experiment in child nutrition in the world. It was now in operation in schools containing over 90 per cent of the elementary school population, but rather less than half the children were taking advantage of it. Examination was now proceeding as to the best means of increasing consumption, but it was already clear that poverty was not the prime difficulty. It was needful to get a greater appreciation of the value of milk among both children and parents.

### The Public Health

The annual report of the chief medical officer of the Ministry of Health for 1935 shows that the population of England and Wales is just over 40 million. The number of births was 598,756, a slight increase on the previous year. The infant mortality was the lowest on record, 57 per thousand births, only half that of thirty years ago. The fall in the birth rate and the increased longevity are producing a gradual aging of the population. At the beginning of the century 520 out of every thousand persons were under the age of 25 years; now the number is only 388. At the former period forty-seven out of a thousand were over 65; now the number is eighty-one. Up to the present the fall in the death rate has compensated for the falling birth rate, but we have now reached a point at which not much further improvement in the death rate can be expected. By the middle of the century the population may attain its maximum and thereafter decline. The most prevalent infectious diseases were scarlet fever (120,456 cases) and diphtheria (65,084 cases).

### Smallpox Infection from Raw Cotton

This country has been free for a long time from smallpox in the form of variola major, but four cases have occurred at Oldham which can be traced only to the handling of raw cotton at a mill. The first case occurred in a vaccinated married woman who worked in the cardroom. The three other cases occurred in her husband, who was vaccinated in 1916, in her son, aged 15, who had never been vaccinated, and in an unvaccinated woman who had been in contact with the original patient. The diagnosis of smallpox was not established early enough in the first case to ensure the successful vaccination of contacts, of whom there were at least ninety-eight in the woman's place of work and twelve at her home. Cotton as a vehicle of smallpox infection has frequently been suspected in the past. In 1913 cases were reported at Oldham as probably due to such infection.

### Tuberculous Infection of Nurses

A subcommittee of the Joint Tuberculosis Council has submitted an important report on tuberculous infection of nurses. Particular attention was given to the age of entry to the profession, which is usually 18 years, but shortage of candidates has reduced the age to 17 in some areas. In view of the special susceptibility of adolescent females to pulmonary tuberculosis, it is considered undesirable that young girls should be employed.

It is therefore recommended that no probationer under the age of 18 should be employed in wards occupied by phthisical patients. But it is pointed out that the age limit is probably of less importance than the care given to the conditions under which young nurses work. In reply to a questionnaire it was ascertained that the hours of nurses in institutions vary from forty-eight to seventy-seven a week, the average for probationers being about sixty. This is somewhat longer than the period recommended by the College of Nursing.

## PARIS

*(From Our Regular Correspondent)*

Dec. 22, 1936.

### Meeting of French Orthopedic Society

The eighteenth annual meeting of the French Orthopedic Society took place October 9 at Paris. Professor Etienne Sorrel presided in place of Professor Le Fort of Lille, who was unable to attend. The two subjects discussed this year were spondylolisthesis and the treatment of faulty union following fractures of the ankle. The reporter of the first of these was Dr. Maurice Guillemet of Lyons, who said that spondylolisthesis was until recently regarded as an anatomic curiosity but that it is now in the domain of orthopedic surgery. The condition can be defined as a sliding of one vertebra on that directly below, involving most frequently the fifth lumbar on the sacrum. If the last lumbar vertebra simply projects over the edge of the sacrum the condition is termed spondylosis, whereas if the last lumbar vertebra forms an angle with or falls in front of the sacrum, as rarely occurs, the term spondyloptosis is used. The results of this change in the normal relation of the last lumbar vertebra and the sacrum are modifications in the form and position of the spine, sacrum and pelvis. The entire lumbar spine is displaced posteriorly in a position of lordosis, forming an angle and not a curve. A scoliosis and change in axis of the sacrum may be found as an associated sequela. Spondylolisthesis is not only found in women, as formerly taught, but according to some authors occurs as frequently in men. It has been observed as early as the age of 15 years and even less, and as late as the age of 50. At times it follows an injury such as a fall from a height on the buttocks or knees. In other cases the only apparent cause is fatigue in certain occupations. In general, the congenital etiology is more common than the traumatic. The pain syndrome is the principal clinical feature. The pains vary in intensity, with indefinite localization in the lumbosacral or anal regions and the thighs. Rarely they are referred to the abdomen, leading to erroneous diagnoses of intra-abdominal disorders. In still other cases the clinical picture is that of a femoral or sciatic neuritis. The pains are worse in the upright position and are not relieved by sitting down or even by lying down. The attitude of the patient is characteristic; the trunk seems to be falling forward as though the thorax were trying to enter the pelvis, resulting in a shortening of the entire body length.

There is a sacrolumbar hollow which is not a lordosis but an angle. Latent or masked forms are at times observed in which the lumbar deformity is absent, the pain being the only symptom that attracts attention, and the lumbosacral vertebral displacement is confirmed by the x-ray examination. On the other hand, one sees occasionally cases in which there is no pain or functional disturbances but with outspoken deformity of the spine. In the majority of cases the diagnosis is based on the x-ray appearance, permitting one to exclude a simple painful lordosis, a sacralization of the last lumbar vertebra or a twisted sacrum.

The profile view is the most important, followed by three-quarter and anteroposterior views, the last named to discover associated lesions. The treatment is either orthopedic or operative. The former includes rest in bed with the knees flexed and trunk raised, radiotherapy, diathermy, and the wearing of a corset for five or six months, at first of plaster and then of leather, molded to the form of the trunk. As surgical measures, bone grafts so as to form a lumbosacral osteosynthesis deserve special mention. The chief indications for operative intervention are inability of the patient to work, intolerable pain and failure of orthopedic treatment.

The discussion was opened by Froehlich of Nancy, who has operated on three of seven women patients by the Albee sacrolumbar graft method. In one of the three the result was very good and in one it was satisfactory, but the third case was a failure. Of four cases treated by orthopedic apparatus, the end result was good in three but poor in the fourth. Graffin of Paris reported five cases (two of spondylosis and three of spondylolisthesis) by the Huc method with satisfactory results. He insisted on roentgenography in the upright position, which revealed a marked displacement in one case, not evident in a film made with the patient lying down. Roederer of Paris divided proposed operations into three groups: (1) those which aim to unite the posterior fixed to the anterior mobile segment, (2) those which fix the anterior segment to the adjacent bones, and (3) those which involve only the posterior segment, solidifying the posterior arcs and the sacrum. Operations in the first of these cannot be carried out because of anatomic and physiologic considerations. Those in the second group have been realized by fixation of the body of the vertebra by the anterior approach. In the third group can be placed the Albee and the Hibbs methods, which have been more successful than any others. Huc of Paris believes that errors have been frequently made in the diagnosis of tilting of the sacrum. Interpretation of films is easy in younger persons but increasingly difficult after the age of 40.

#### TREATMENT OF FAULTY UNION FOLLOWING FRACTURES INVOLVING THE ANKLE

The report on the second subject had been prepared by Dr. Paul Padovani of Paris. He divided the displacements of the foot into (*a*) outward, (*b*) backward, (*c*) inward (rare) and (*d*) forward. The functional disturbances are of as great importance as the deformity. The films of the injured ankle must always be compared with those of the uninjured side. Faulty union is the result either of incomplete reduction of the primary displacement or the recurrence of the latter in the cast or other apparatus or too early use of the limb. Following reduction under fluoroscopic control, the patient should not be allowed to use the limb for at least seven weeks. In some cases a primary open operation is the only means available for reduction of displaced fragments. Secondary operations include osteotomy directly at the seat of fracture or supramalleolar-tibiofibular orthopedic resection and astragalectomy. The last named has been somewhat unjustly discarded because of the difficult technic. The chief reasons for the present unpopularity of astragalectomy are the persistence of pain and the necessity of an additional osteotomy, especially of the outer malleolus. Tibiotarsal resection and arthrodesis have been employed by Kimberley, who reports some good results. The indications for this operation are the same as for astragalectomy. The best type of operation for malunion following fractures of the ankle is osteotomy. Astragalectomy should be done only in old fractures with marked osteophyte formation and changes in the joint cartilages. Arthrodesis or tibiotarsal resection will be reserved for very severe joint deformity and for cases in which an anterior astragalectomy has been followed by persistence of pain.

In the discussion, Boppe of Paris emphasized the difficulty of reduction after osteotomy of the malleoli. He employs the Kirschner method. He has followed up a number of osteotomized patients and found that a painful form of arthritis still existed several years after operation. Massart of Paris

prefers astragalectomy in older cases in which one encounters, in addition to joint changes, a retraction of tendons and an abundant amount of scar tissue. Tavernier of Lyons also believed that, when reduction is not possible by other means, astragalectomy is the final resort, in spite of the lack of uniformity of the results and the fact that a certain number of patients continue to have pain in walking.

### Attending Staffs of Public Hospitals to Be Compensated by Pay Patients

There is a sharp line of demarcation here between public hospitals supported by the local governing bodies and private (pay) institutions (maisons de santé). There are comparatively few public institutions in France in which patients who are unable to pay are housed in separate portions of the same buildings from those who can do so. This is especially true of smaller communities; hence the paying and the free patients are treated in the same wards. The injustice of asking the medical staffs of such mixed free and pay institutions to treat the pay patients without any remuneration has been the source of many complaints by the organized profession. A recent decree (Feb. 21, 1936) of the government states that the physicians and surgeons of public hospitals have the right to receive special remuneration for services rendered to pay patients. However, such fees shall be collected by the hospital and then divided among the members of the staff in a manner to be agreed on between the hospital administrator and the staff.

### One Thousand Personal Observations on Pulmonary Tuberculosis in Children

At the October 13 meeting of the Academie de médecine a paper on the different forms of pulmonary tuberculosis in children based on 1,000 cases was read by Armand-Delille, Lestocquoy, Bayle and Lebreton. The incidence of the disease decreases after the first few years of life (forty-one cases between the ages of 9 and 10 years, as compared to ninety-two between 1 and 2 years). The incidence, however, increases rapidly after the age of 12 years, to reach the high figure of 156 between the ages of 14 and 15 years. During the first four years of life, only primary infection is encountered. After the fifth year a division is more difficult because the splenopneumonias and acute tuberculous pneumonias are not necessarily manifestations, as some pediatricians wrongly maintain, of a primary infection. Before the age of 4 years, three types of ganglio-pulmonary tuberculosis are to be seen; the first is characterized by extensive fatal caseous pneumonia lesions, the second by widespread pneumonic foci but regressive and associated with adenopathy. The third type is characterized by a rapid fatal miliary tuberculosis. The primary infection form of tuberculosis in younger children, like the reinfection form of older children, involves the right apex in the majority of cases.

### Necessity of Routine Radiography in Accident Cases

Two recent medicolegal cases are of interest in showing that it is advisable in every accident case in which there is a suspicion of a fracture or dislocation that the physician or surgeon in charge should refuse to assume all responsibility unless the patient consents to have an x-ray examination made as soon as possible after the accident.

In the first suit for damages, a physician was called to take care of a backward dislocation of the shoulder, which was difficult to diagnose by palpation. As a result of nonreduction there was marked permanent functional disability. The husband of the plaintiff claimed that an x-ray examination should have been made. The defendant maintained that he had asked for the application of this method of diagnosis but that the plaintiff had refused to have this done. The jury decided in favor of the defendant. Dr. J. Noir, who reported the case in the November 22 *Concours médical,* states that whenever an injured person refuses to have an x-ray examination for a suspected fracture or dislocation such a refusal should be in writing and signed in the presence of two witnesses.

In the second damage suit, a diagnosis of a simple comminuted fracture of the head of the humerus was made by palpation by the attending surgeon. The patient requested that an x-ray examination be made but was told that this would be superfluous. Seventeen days later, during the absence of the attending surgeon, his assistant had an x-ray examination made. This revealed a subcoracoid dislocation of the humerus without an accompanying fracture. Following reduction, a paralysis of the injured right arm was noted. The patient was an artist and hence unable to earn a living because of inability to use the arm. Experts appointed by the court estimated the incapacity to be 75 per cent but were unable to state whether or not the paralysis was the result of the unrecognized dislocation. A verdict of 160,000 francs (about $8,000) was given in favor of the plaintiff. This verdict was to a great extent due to the refusal of the first attending surgeon to have an x-ray examination made.

### Medal Presented to Laryngologist

Prof. Fernand Lemaitre, ear, nose and throat specialist, was recently named Commander of the Legion of Honor. To commemorate this recognition of his distinguished services and also the twenty-fifth anniversary of his occupancy of the position of ear, nose and throat physician to the public hospitals of Paris, his former pupils and friends presented Professor Lemaitre with a special medal December 10 at the Lariboisière Hospital. His clinic at the latter has been visited by many foreign specialists.

### The French Surgical Congress

At the 1936 session (held at Paris October 9) Inspector General Rouvillois of the French army was elected president and Dr. Leon Imbert of Marseilles vice president for the 1937 meeting. The subjects selected for discussion for next year's congress are (1) physiologic pathology of burns, (2) treatment of fractures of the leg, and (3) surgical treatment of embolism of the extremities.

## BERLIN

*(From Our Regular Correspondent)*

Dec. 7, 1936.

### The Congress for Research on Light

The third international congress for research on light was held at Wiesbaden in September. Professor Moede of Berlin has investigated the problem of eye fatigue and has sought to establish an equivalent for the power of the eye and beyond that for the individual constitution itself, which would insure an amount of work that would not fatigue. Practical examination of the capability of an eye to carry on continued close work in industrial occupations demonstrates the extraordinary powers of resistance possessed by the organ even in the presence of severe defects. Nevertheless optimal working conditions for the eye must be created. If the eye becomes fatigued, there appear manifestations of irritation and of decrease in function; basal functions also are altered, wholly apart from the influence on the organism as a whole.

Professor Birch-Hirschfeld, Koenigsberg ophthalmologist, discussed the favorable therapeutic results from the use of ultraviolet rays in disorders of the eye. Ultraviolet rays have proved their worth in the course of the last eighteen years from their use in a vast amount of clinical material. They have for example reduced the proportion of losses in ulcus serpens from 30 per cent to 6 per cent. The rays have likewise been productive of favorable results in other diseases of the cornea, conjunctiva and sclera. The curative effect of ultraviolet rays often depends not on their bactericidal capability but on a

stimulation of the normal tissue cells by which the purification of the focus of disease and the process of scarification are substantially aided.

According to Memmesheimer of Essen, the defense mechanism of the skin is set in action in two places, in the epithelium and in the cutis. In the epithelium vitamin D and histamine-like hormones are found. These substances pass through and exert an influence on the entire organism. In the cutis the histiocytes of the tissues, the vascular endothelium and the blood itself all achieve a special capability of defense under the influence of light.

Lomholt of Copenhagen discussed the use of light in the treatment of nontuberculous diseases of the skin. In lupus erythematosus cases that present chronic keratosic plaques of long standing an excellent symptomatic effect is often obtained by irradiation with fractionated doses (applied for from five to thirty minutes).

Cure or amelioration is also many times effected by use of the Finsen-Lomholt lamp in persisting severely itching neurodermatitis localis and in hyperkeratosic chronic eczema. In naevus flammeus the lamp produces a thoroughgoing blanching. It is also used in the treatment of rhinophyma.

Radnai of Budapest called attention to his experimental use of ultraviolet irradiation in syphilis. He has been able to demonstrate that this type of irradiation or a combination with autohemotherapy serves to increase both the reactive capability and the formation of the antisyphilitic immune bodies and the antibodies in the skin. He found that after from thirty to fifty ultraviolet irradiations or after thirty ultraviolet irradiations and twenty autohemic treatments the Wassermann reaction was negative in 60 per cent of the cases. The proper clinical sphere of indication for this combined treatment is late syphilis, especially in the lancinating pains, myalgias, arthralgias and neuralgias that accompany the crises of fully developed tabes. Favorable influence was noted in 142 such cases. For paralyses that show themselves refractive to malariotherapy, Radnai advocates photochemical treatment.

Other papers dealt with the use of radiotherapy in the various forms of tuberculosis. The topic "Light and Public Health" also was discussed but only in its more general aspects.

### Marriage and Divorce Statistics

As previously mentioned, there were around 650,000 marriages during 1935. From August 1933 to July 1, 1936, marriage subsidy loans were advanced to 602,149 couples (THE JOURNAL, Sept. 2, 1933, p. 791). The law stipulates that for each child born in wedlock the amount of indebtedness to the government shall be reduced by 25 per cent. Before the end of June 1936 so many children had been born to the couples in question that 390,445 such reductions had to be made.

Divorce statistics of the past few years are noteworthy. In 1933, 42,000 marriages were dissolved (figures for earlier years may be found in THE JOURNAL, May 26, 1934, p. 1774). The divorced couples represented by the foregoing figure were the parents of 36,500 minor children. If to this number is added the number of minor children of couples divorced prior to 1933, an estimated grand total of 300,000 such "divorce orphans" is arrived at. In 1934 a record number of divorces (54,402) was reached; this represented an increase of 28 per cent over 1933 and of 12 per cent over the previous high (in 1921). In 1935 the number of divorces decreased by about 8.5 per cent, 47,784 marriages being dissolved. Per 10,000 existing marriages in 1935 there were only about thirty-three divorces, compared to a corresponding figure of thirty-seven divorces in 1934. It is significant that the decline in the number of divorces in 1935 was effective for every age group with the exception of those couples who had been married as recently as 1934 and 1935. With regard to culpability for the failure of the marriage, the statistics for 1935 virtually coincided with the 1934 figures: in about 46 per cent of the cases the husband alone was pronounced guilty, in about 20 per cent the wife alone was held responsible and in the remaining cases blame rested on both spouses. Of the couples divorced in 1935, 22,703 (45.6 per cent of the total) had no children whatever, 15,028 couples had one child, 7,199 couples had two children and 4,853 couples had three or more children.

### Telephonic Apparatus and Tuberculous Infection

Extensive observations by Prof. Ludwig Lange at the National Health Bureau Laboratory for Experimental Research on Tuberculosis have just been made public. The possibilities of a transmission of infection from droplets coughed into the mouthpieces of telephones are theoretically well known. The question is What becomes of the bacilli? Do they perish? Can they again become detached if lodged on the mouthpiece of a telephone? Is there real danger of infection? Any theory of such transmission must be based on the complete desiccation of the droplets on the one hand and a strong current of air from the mouth of the subsequent user of the instrument on the other. The danger of transmission of infection by telephone apparatus is far less from a theoretical standpoint than the danger of crowds or from such a commonly used article as paper currency.

As early as 1889 the National Health Bureau examined three telephones that were equipped with the typical wooden accouterments of the time. The presence of pathogenic organisms and of tubercle bacilli in particular could not be demonstrated. In the years 1913 and 1914 similar examinations of telephones, including instruments used by openly tuberculous persons in sanatoriums, were again carried on, and in no instance was the presence of tubercle bacilli demonstrable. Again in the autumn of 1934 another series of examinations was initiated, largely in response to an ever increasing popular clamor with regard to the suspected transmission of disease and of tuberculosis in particular by telephonic apparatus. These examinations were of peculiar interest, as similar investigations had been undertaken with negative results in England (in 1912) and also in America.

In the more recent investigation in Germany, thirty-four telephones were examined. This material included telephones that had seen service in private residences, public booths, telephone exchanges and, in addition, instruments that had been used by openly tuberculous patients in sanatoriums. A complete examination of each telephone was made. Cultures in various nutrient mediums were tried as well as repeated inoculations of guinea-pigs with the dusts from the various appliances. Of the thirty-four telephones, twenty were allowed to remain uncleaned prior to the examination and fourteen were cleaned according to the daily routine employed by the Deutsche Reichspost for all its public telephones. No tubercle bacilli could be detected on any of the fourteen disinfected instruments. In only two instances could virulent tubercle bacilli be demonstrated in guinea-pigs inoculated with dusts from the twenty uncleaned telephones, although four of these instruments had been intentionally chosen because of the repeated usage to which they had been subjected by tuberculous patients in sanatoriums. In one of these cases only the bovine type bacillus could be cultured out. This case can scarcely be adduced as incontestable proof of the presence of virulent tubercle bacilli on the telephone apparatus. In the second case the dust used in inoculation had been removed from an instrument that had been used repeatedly and frequently by a patient with severe open tuberculosis. Only one of the four guinea-pigs used in the experiment actually became ill and in this case it was possible to culture the human type tubercle bacillus. When the apparatus used by the severely tuberculous patient was cleaned, tubercle bacilli could no longer be detected in dust specimens.

This is actually the first time that the presence of virulent tubercle bacilli on a telephonic apparatus has been demonstrated.

This single finding ought not to be considered of any general significance, for it by no means proves that the user of public telephones runs the risk of becoming infected. It should also be kept in mind that for the purpose of these examinations the layers of dirt underwent a much more thorough process of removal and collection together than would ever take place under ordinary circumstances. Professor Lange concludes from his investigations that there exists no real danger of infection from the use of a telephone.

## ITALY

*(From Our Regular Correspondent)*

Nov. 15, 1936.

### National Congress of Surgery

The forty-third National Congress of Surgery, which was organized by the Società Italiana di Chirurgia with the collaboration of all the directors of the surgical clinics of the Italian universities, the general directors of health and sanitation of the army and the navy and many foreign surgeons, took place recently in Rome. Professor Grant of Philadelphia was also present.

The first official topic was trauma of the spinal column. Professors Donati and Lapidari of Milan spoke on fractures of the spine and osteo-articular lesions from trauma. The frequency of spinal fractures depends on the improvement of the diagnosis rather than in an actual increase of fractures. The conditions of the spine should be verified by means of x-ray examination of the structure (at least in the anteroposterior and lateral views) in all cases of spinal trauma, because of the fact that by ignoring the nature of the vertebral lesion and giving the patient erroneous or insufficient treatment there may develop secondary functional or anatomic alterations of the spine. Total fractures, as a rule, are caused by an indirect mechanism, especially by compression in hyperflexion of the spine. Compression in hyperextension of the spine, crushing, squashing and torsion are also causes of total fractures. Partial fractures involving the spinous and transverse apophyses and sometimes the vertebral arches may be caused by an indirect mechanism. The lesions of the vertebral bodies caused by muscular contracture in tetanus induce structural changes in the spongy tissues of the vertebra. Complete anterior luxation of the atlas is rare. It causes death by compressing the spinal cord within the posterior vertebral arch and the odontoid vertebra. The fracture of the odontoid process of the second cervical vertebra is grave if it complicates anterior luxation of the atlas. The odontoid process has a tendency not to consolidate to the vertebra after a fracture. For this reason it is necessary to verify the consolidation of the process to the vertebra, by means of x-ray examination of the latter before immobilization is discontinued. The fifth cervical vertebra also is frequently fractured. The fracture is caused by an indirect mechanism. It is frequent in persons who dive into shallow water. The treatment of selection is reduction of the fracture by continuous traction with the patient in bed. Laminectomy fails in giving satisfactory results. If the symptoms given by the spinal cord are due to hematomyelia or to edema of the spinal cord they are resolved by themselves, regardless of performing or not doing a laminectomy. In cases of lesions already established in the neuro-axis, the conditions of the patient are aggravated by a laminectomy. Fractures of the dorsolumbar segment involve frequently the twelfth dorsal and the first lumbar vertebra. They are induced by an indirect mechanism and by compression. The lesions of the intervertebral disks are characteristic. The treatment of preference is immediate reduction of the lesion and immobilization. In order to give the patient general anesthesia, he is placed on a suspension hammock which determines hyperextension of the spine with the patient in the supine position. Orthopedic surgery is indicated in fractures of the vertebral arches, laminae and pedunculi.

Professor Antonucci of Milan spoke on the lesions of the spinal cord and of the roots of the spinal nerves from trauma of the spinal column. According to the speaker, orthopedic surgery in association with systematic lumbar and cisternal punctures (for preventing blockage of the cerebrospinal fluid) is indicated in cases of medullary lesions from trauma. In open lesions of the spinal cord the treatment should preferably be surgical, consisting in cleansing the wound and performing a laminectomy. Suturing the spinal cord should be avoided. The attempts of treating complete transverse section of the lumbosacral spinal cord by interradicular or intercostoradicular anastomoses, according to Antonucci's technic, should be studied by experiments and be used in cases of this nature.

The second official topic was "Surgery of Cranial Nerves." Professors Fasiani and Belloni of the University of Padua spoke on surgery of the intracerebral optic tract. They discussed the diseases of the optic segment which is included within the optic canal and the primary optic nerves, for the surgical approach to which the cranium has to be opened. Tumors of the optic nerve and of the optic chiasm are rare. More frequent than the latter are tumors of the sella turcica and of the parasellar region with visual symptoms. The speakers gave a classification of these tumors. They described also a technic for examination of the optic chiasm area as well as for the opening of the optic canal by the intracranial and orbital routes of approach.

Professor Dogliotti of Modena University spoke on surgery of the facial and trigeminal nerves. In treating trigeminal neuralgia the peripheral operations (alcoholization and section of the external branches) was followed by central operations, first on the gasserian ganglion and then on the retroganglionic roots, and on the temporal and pontile-petrous tracts. Operations on the gasserian ganglion are alcoholization, electrocoagulation and gasserectomy. The operations on the retroganglionic routes may be made by the temporal route (Frazier's technic), the cerebellar route (Dandy's technic) or the supratentorial occipital route (Dogliotto's technic). In the latter the route of approach is a supratentorial retro-auricular craniotomy. In sectioning the root of the trigeminal nerve (which is easily identified when the occipital lobe is raised and the cerebellum is slightly displaced) the motor root is easily left untouched. The speaker advises partial neurotomy with removal of two thirds or three fourths of the root in order to preserve a part of the sensitivity of the face and especially of the cornea and the conjunctiva. Professor Dogliotti discussed surgery in peripheral paralysis and essential spasms of the facial nerve. In traumatic paralysis by total section of the nerve it is advisable to perform an early or immediate operation. In all the other forms of peripheral paralysis it is advisable to give the patient several of the direct and indirect causal treatments for some months and then resort to operation. Resection of the nerve with freshening of the stumps and implantation of a nerve graft in the stumps of the resected nerve (Ballace and Duel operation) is indicated. In essential spasms of the facial nerve, blockage of the nerve with alcohol or by electrocoagulation, partial neurotomy, nervous grafts and plastic operations are indicated. Up to now none of the technics have given permanent satisfactory results, unless the functions of the nerve are sacrificed. The speaker reported satisfactory results from a technic which consists in sectioning the nerve, removal of about half of the central stump and neurotization of the peripheral branches by means of the residual portion of the central stump.

The next congress will meet at Turin. The following will be the official topics: (1) tumors of the sella turcica and suprasellar area, (2) indications and late results of removal of calculi of urinary tract, and (3) late results of operation of gastroduodenal and jejunal ulcers.

## JAPAN

*(From Our Regular Correspondent)*

Nov. 15, 1936.

### A Study of Intermarriage

On the coast of western Japan called Oita there is a small fishing village known as Usuki, where the inhabitants have strictly kept the custom of intermarriage for hundreds of years and are said never to have married the people of other villages in the neighborhood. Dr. Takeshi Ikemi, who has been investigating the biologic influence of intermarriage in the village since 1933, reports that, according to tradition, this village was settled in 1605. The villagers still believe that they are the descendants of a noble family which was obliged to flee in the civil war of the sixteenth century. There are 135 families having 1,786 members in all (904 men and 882 women). They have never mingled with other villagers or townsmen except in business transactions; consequently their habits and customs are quite different from other Japanese. The ceremonies of coming of age, marriage, burial, ancestral worship, and bringing up children are all held in their own way within their own village, and they strictly refuse to be assimilated. They are somewhat ferocious and sly, but sometimes are quite candid. The men engage in fishing and a little farming, while the women deal in the fish which the men collect and dry. They have no religious faith in its true sense, and they think little of schooling, partly because they are too poor to send their children to school. Although the children are not regular attendants at school, an investigation of the school records shows that they generally do well at school. Thus intermarriage never affected their intellectual faculties. Crime is rare. During the last ten years seven violated the fishing law, four injured others, four did some stealing, four broke the law of weights and measures, eight were charged with gambling, one cheated others, two were robbers, five interfered with

TABLE 1.—*Birth Rate* *

| Village Name | Population | Births 1928 | 1929 | 1930 | 1931 | 1932 |
|---|---|---|---|---|---|---|
| Usuki..... | 1,786 | | | | | |
| Boy..... | | 36 (2.02) | 39 (2.18) | 41 (2.20) | 39 (2.18) | 39 (2.18) |
| Girl..... | | 31 (1.70) | 37 (2.06) | 26 (1.40) | 23 (1.94) | 33 (1.94) |
| Next village.. | 1,383 | | | | | |
| Boy..... | | 21 (1.51) | 22 (1.59) | 30 (2.16) | 29 (2.09) | 20 (1.45) |
| Girl..... | | 22 (1.59) | 36 (2.60) | 22 (1.59) | 19 (1.37) | 28 (2.02) |
| Next but one | 1,072 | | | | | |
| Boy..... | | 17 (1.58) | 18 (1.67) | 20 (1.86) | 20 (1.86) | 19 (1.77) |
| Girl..... | | 20 (1.86) | 11 (1.26) | 12 (1.11) | 16 (1.49) | 14 (1.30) |

* Figures in parentheses indicate percentages.

government officials in the execution of their duty, and three other derelictions brought the total instances of malfeasance to thirty-eight. Judging from this, it may be affirmed that intermarriage does not bring about the degeneration of mental control. This number of violations is small when compared with that of the neighboring villages or towns.

The sanitary knowledge of the people is meager; they have epidemic diseases, such as dysentery and cholera, but there is never any serious hereditary disease. Leprosy, syphilis and elephantiasis at present are not seen among them. Neither color blindness nor insanity occurs. The constitution of the people is strong and they are good wrestlers in spite of their taking very simple food. In the physical examination for conscription, these villagers have always ranked first, in that prefecture, with respect to health and constitution. In their daily life the men are quiet and amiable, while the women are talkative. When a quarrel does occur the women are usually the leaders. However, they are usually kind and good to one another, especially to those in distress. Divorce is rare. The birth rate, in comparison to that of the two neighboring villages, is given in table 1. This table shows that intermarriage does not affect the birth rate. Stillbirths are uncommon. The death rate is given in table 2.

There are now twenty-seven couples who married cousins. Through various inquiries, the following facts have been obtained: When the parents are both excellent mentally and physically, 80 per cent of the children are as excellent as their parents, 20 per cent are good, and none are worse than the parents. If the parents are good though not excellent, 15 per cent of the children are excellent, 75 per cent are as good as

TABLE 2.—*Death Rate* *

| Village Name | Population | Deaths 1928 | 1929 | 1930 | 1931 | 1932 |
|---|---|---|---|---|---|---|
| Usuki..... | 1,786 | | | | | |
| Boy..... | | 22 (1.23) | 27 (1.51) | 26 (1.40) | 28 (1.56) | 20 (1.11) |
| Girl..... | | 16 (0.80) | 20 (1.11) | 23 (1.28) | 18 (1.0) | 24 (1.34) |
| Next village.. | 1,383 | | | | | |
| Boy..... | | 13 (0.94) | 13 (0.94) | 20 (1.45) | 20 (1.45) | 16 (1.15) |
| Girl..... | | 9 (0.65) | 16 (1.15) | 15 (1.08) | 19 (1.37) | 9 (0.65) |
| Next but one | 1,072 | | | | | |
| Boy..... | | 9 (0.83) | 17 (1.59) | 11 (1.02) | 9 (0.839) | 11 (1.02) |
| Girl..... | | 12 (1.11) | 14 (1.305) | 7 (0.65) | 13 (1.21) | 7 (0.65) |

* Figures in parentheses indicate percentages.

their parents and 10 per cent are not as good as the parents. On the contrary, if neither of the parents is good, the children are all inferior to the children of other families at large. If the parents are both good physically but not mentally, the children are all good physically, 10 per cent of them are excellent mentally, 70 per cent are mentally good and 20 per cent are inferior. To sum up, when the excellent are married, no bad results are to be found.

### Institutional Celebrations

The golden jubilee of the Military Medical College was celebrated November 7 before the four imperial princes and 1,200 other attendants. This school was established in 1886, and since then 5,165 graduates have been turned over to the military. The Japan Military Medical Asociation joined in the celebration. As a memorial, the school history was compiled and published. A memorial tower will be erected by next April and the memorial lecture room will be completed by next fall.

Another jubilee was held by the Japan Red Cross Society Hospital in Tokyo, and at the same time the completion of an outpatient building was celebrated. The building cost more than a million yen, has 365 beds, and the equipment of the roentgenotherapy department is said to be the greatest in the Orient. The hospital was established Nov. 17, 1886.

## *Marriages*

MAURICE ALEXANDER KUGEL, New York, to Miss Annie Laurie Harrison of Liberty, S. C., in Fort Myers, Fla., Oct. 4, 1936.

JOSEPH J. REICHMAN, Mount Pleasant, Pa., to Miss Bessie Irene Comins of Mount Pleasant, Mich., Oct. 1, 1936.

WILLIAM DEWEY HALL, Raleigh, N. C., to Miss Sue Ruth Hutto of Gaston, S. C., in Raleigh, Oct. 17, 1936.

CLYDE G. O'BRIEN, Appomattox, Va., to Miss Ellen Elizabeth Sweizer, of Elm Grove, W. Va., Oct. 11, 1936.

RALPH GIBSON FLEMING, North Side, N. C., to Miss Sue Fleming Thompson of Creedmor, Oct. 15, 1936.

SOUTHGATE LEIGH JR. to Miss Maud Paine Winborne, both of Norfolk, Va., in Richmond, Nov. 3, 1936.

FRANKLIN SMITH CROCKETT, Lafayette, Ind., to Miss Henrietta Coleman of Rushville, January 2.

# Deaths

**Roy Hayman McKay** ⊕ Miami, Fla.; Medical College of Ohio, Cincinnati, 1906; formerly a practitioner in Akron, Ohio; past president of the Summit County (Ohio) Medical Society; fellow of the American College of Surgeons; at various times on the staffs of the People's Hospital, Children's Hospital and City Hospital, Akron, and the Citizens Hospital, Barberton; served during the World War; co-author of "Let's Operate"; aged 53; died, Nov. 28, 1936, in a local hospital, of injuries received in a fall.

**Harry Feld Mather,** Kansas City, Mo.; University Medical College of Kansas City, 1895; member of the Missouri State Medical Association; at one time assistant professor of anatomy and assistant to the chair of surgery at his alma mater; formerly on the staffs of St. Luke's, St. Joseph, Menorah and Research hospitals; medical director of the Midland Life Insurance Company; aged 64; died, Nov. 23, 1936, of cerebral hemorrhage.

**Thomas DeWitt Gordon** ⊕ Grand Rapids, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1909; member of the American Academy of Pediatrics; fellow of the American College of Physicians; past president of the Kent County Medical Society; served during the World War; on the staff of the Blodgett Memorial Hospital; aged 56; died, Nov. 20, 1936, of coronary thrombosis.

**Frank Paul Pettey,** Decatur, Ala.; University of Nashville (Tenn.) Medical Department, 1892; member of the Medical Association of the State of Alabama; past president of the Morgan County Medical Society; was president of the county board of health; served during the World War; aged 69; died, Nov. 26, 1936, in the Wallace Sanitarium, Memphis, Tenn.

**Malcolm Newlon,** Lincoln, Kan.; University Medical College of Kansas City, 1910; member of the Kansas Medical Society; secretary of the Lincoln County Medical Society; served during the World War; formerly member of the city council and health officer; chairman of the school board; aged 50; died, Nov. 18, 1936, in St. John's Hospital, Salina.

**Alva J. Weedn** ⊕ Duncan, Okla.; Central University of Medicine and Science, Jersey City, N. J., 1901; past president of the Stephens County Medical Society; formerly secretary of the Oklahoma Hospital Association; president emeritus of the Southern Oklahoma Medical Association; owner of a hospital bearing his name; aged 61; died, Nov. 15, 1936.

**Charles Dickinson Phelps,** West Haven, Conn.; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1895; member of the Connecticut State Medical Society; at one time instructor in physical diagnosis at Yale University School of Medicine, New Haven; aged 68; died, Nov. 24, 1936, of chronic myocarditis.

**John George O'Meara** ⊕ Providence, R. I.; University of Pennsylvania Department of Medicine, Philadelphia, 1899; formerly member of the state legislature; aged 68; member of the staffs of the Homeopathic Hospital and St. Joseph's Hospital, where he died, Nov. 22, 1936, of carcinoma of the head of the pancreas with metastasis to the liver.

**Benjamin Thomas Sharp** ⊕ Kansas City, Mo.; St. Louis College of Physicians and Surgeons, 1897; aged 62; member of the staffs of the Research Hospital, Menorah Hospital and St. Mary's Hospital, where he died, Nov. 30, 1936, of pneumonia, following a hip fracture received in a fall.

**George Everett Tucker,** Salem, Mass.; Medical School of Maine, Portland, 1908; member of the Massachusetts Medical Society; physician for the city schools; aged 53; on the staff of the Salem Hospital, where he died, Nov. 30, 1936, of arteriosclerosis and cerebral hemorrhage.

**Noe Franklin Chostner,** Cape Girardeau, Mo.; St. Louis College of Physicians and Surgeons, 1905; member of the Missouri State Medical Association; on the staffs of the Southeast Missouri Hospital and St. Francis Hospital; aged 56; died, Nov. 13, 1936, of heart disease.

**William J. Kellow,** Watertown, N. Y.; Victoria University Medical Department, Coburg, Ont., Canada, 1882; for many years on the staffs of the House of the Good Samaritan and the Mercy Hospital; aged 77; died, Nov. 23, 1936, in St. Petersburg, Fla., of uremia.

**Albert Schloemilch,** Portage, Wis.; Hahnemann Medical College and Hospital, Chicago, 1875; member of the State Medical Society of Wisconsin; aged 82; on the staff of St. Saviors General Hospital, where he died, Nov. 15, 1936, of acute enteritis.

**George Clarkson Worth,** Kiangyin, Kiangsu, China; University of Virginia Department of Medicine, Charlottesville, 1892; medical missionary of the Presbyterian Church in China; stationed at the Kiangyin Christian Hospital; aged 69; died recently.

**Milton Jefferson Moore** ⊕ Vernon, Texas; Vanderbilt University School of Medicine, Nashville, Tenn., 1914; formerly member of the school board; part owner of a hospital bearing his name; aged 47; died, Nov. 17, 1936, of angina pectoris.

**John Frederick Shaw,** Fairfield, Maine; University of Toronto (Ont.) Faculty of Medicine, 1914; member of the Maine Medical Association; superintendent of the Central Maine Sanitarium; aged 47; died, Nov. 22, 1936, of cardiac asthma.

**Thompson R. Terwilleger,** Lima, Ohio; Medical College of Ohio, Cincinnati, 1887; member of the Ohio State Medical Association; member of the staffs of St. Rita's and Memorial hospitals; aged 75; died, Nov. 26, 1936, in a hospital at Cincinnati.

**James Elmer Wright** ⊕ Rochester, N. Y.; University of Buffalo School of Medicine, 1913; served during the World War; aged 48; on the staff of the Rochester General Hospital, where he died, Nov. 24, 1936, of dissecting aneurysm of the aorta.

**Peter John Christofferson** ⊕ Waupaca, Wis.; Marion-Sims College of Medicine, St. Louis, 1897; past president of the Waupaca County Medical Society; aged 67; part owner of the Waupaca Hospital and Clinic, where he died, Nov. 27, 1936.

**Charles Atwell Kearney,** Des Moines, Iowa; State University of Iowa College of Medicine, Iowa City, 1898; served during the World War; member of the staff of the Veterans Administration Facility; aged 68; died, Nov. 19, 1936, in Iowa City.

**Luther Asbury De Loach** ⊕ Savannah, Ga.; Atlanta College of Physicians and Surgeons, 1905; formerly mayor of Glennville; on the staff of the Warren A. Candler Hospital; aged 53; died, Nov. 22, 1936, of angina pectoris.

**Herschel Charlton Ezell** ⊕ Nashville, Tenn.; University of Tennessee Medical Department, Nashville, 1911; member of the American Academy of Ophthalmology and Oto-Laryngology; aged 48; died, Nov. 26, 1936.

**Edwin Parker Pitman,** New Haven, Conn.; Dartmouth Medical School, Hanover, N. H., 1891; member of the Connecticut State Medical Society; aged 73; died, Nov. 25, 1936, of prostatic hypertrophy and hydronephrosis.

**William Buckman Holcombe,** Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1895; aged 62; died, Nov. 24, 1936, in the Hahnemann Hospital, of adenocarcinoma of the cecum and ascending colon.

**Elmer E. Kirk,** Newcastle, Ind.; Cincinnati College of Medicine and Surgery, 1888; member of the Indiana State Medical Association; aged 74; on the staff of the Henry County Hospital, where he died, Nov. 13, 1936.

**Sarah Mann Wilbur,** Springfield, Mass.; Woman's Medical College of Pennsylvania, Philadelphia, 1885; member of the Massachusetts and Rhode Island medical societies; aged 83; died, Nov. 20, 1936, of chronic nephritis.

**Monte A. Stern** ⊕ Sioux Falls, S. D.; John A. Creighton Medical College, Omaha, 1908; fellow of the American College of Surgeons; on the staffs of the Sioux Valley and McKennan hospitals; aged 51; died, Nov. 8, 1936.

**Charles Himes Metzel,** Sidney, Ill.; University of Illinois College of Medicine, Chicago, 1931; member of the Illinois State Medical Society; on the staff of the Mercy Hospital, Urbana; aged 31; died, Nov. 20, 1936.

**Jeptha Jonson Thibault,** Atlanta, Ga.; University of Arkansas School of Medicine, Little Rock, 1936; aged 24; intern at the Piedmont Hospital, where he died, Nov. 19, 1936, of a Streptococcus viridans infection.

**Frank Cornwall McTavish,** Vancouver, B. C., Canada; University of Toronto Faculty of Medicine, 1899; L.S.A., London, 1901; L.R.C.P., London, and M.R.C.S., England, 1903; aged 64; died, Nov. 8, 1936.

**Robert Haldane Mitchell,** Bowie, Texas; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1883; aged 75; died, Nov. 17, 1936, in the Bowie Clinic Hospital, of gallbladder disease.

**Walter Herman Miller** ⊕ Portland, Ore.; University of Oregon Medical School, Portland, 1922; formerly Clackamas County physician and health officer; aged 39; died, Nov. 15, 1936, of multiple sclerosis.

**Henry Clay Lloyd** ⊕ Hobart, Okla.; Medical College of Ohio, Cincinnati, 1901; past president of the Kiowa County Medical Society; on the staff of the General Hospital; aged 59; died, Nov. 17, 1936.

**Daniel E. Keys,** Spokane, Wash.; St. Louis College of Physicians and Surgeons, 1893; for many years a druggist; formerly coroner of Mullan, Idaho; aged 66; died, Nov. 19, 1936, of heart disease.

**Benjamin Lowen Hume** ⊕ Mallory, W. Va.; Medical College of Virginia, Richmond, 1900; formerly coroner of Cabell County; aged 62; died, Nov. 26, 1936, in the Mercy Hospital, Logan, of pneumonia.

**William Gabriel Kiebler,** Enid, Okla.; University of Louisville (Ky.) Medical Department, 1905; member of the Oklahoma State Medical Association; aged 53; died, Nov. 29, 1936, of pneumonia.

**Hardman Nathan Kinnear,** Oberlin, Ohio; Western Reserve University Medical Department, Cleveland, 1882; for many years a missionary in China; aged 76; died recently in Baton Rouge, La.

**Frank Creighton Shute,** Opelousas, La.; Tulane University of Louisiana Medical Department, New Orleans, 1904; member of the Louisiana State Medical Society; aged 57; died in November 1936.

**William Washington Liles,** Gainesville, Ga.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1899; member of the Medical Association of Georgia; aged 61; died, Nov. 6, 1936.

**John A. Voorhees,** Brooklyn; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1889; aged 68; died, Nov. 29, 1936, in Bay Ridge Hospital, of pneumonia.

**Francis Edward Park,** Washington, D. C.; Howard University College of Medicine, Washington, 1886; aged 82; died, Nov. 12, 1936, in the Garfield Hospital, of injuries received in a fall.

**John T. Wray,** New Albany, Ind.; University of Louisville (Ky.) Medical Department, 1898; member of the Indiana State Medical Association; aged 65; died, Nov. 6, 1936, of arteriosclerosis.

**Percy Albert Sloane,** Houston, Texas; Baylor University College of Medicine, Dallas, 1914; member of the State Medical Association of Texas; aged 45; died, Nov. 24, 1936, of angina pectoris.

**Albert C. Speers,** Pittsburgh; University of Pennsylvania Department of Medicine, Philadelphia, 1889; aged 71; died, Nov. 16, 1936, in the Montefiore Hospital, of cerebral hemorrhage.

**Everett Carlisle Major,** Latta, S. C.; Atlanta (Ga.) College of Physicians and Surgeons, 1905; served during the World War; aged 56; died, Nov. 26, 1936, of coronary occlusion.

**Herman Elof Almquist,** Los Angeles; Loyola University School of Medicine, Chicago, 1919; formerly a practitioner in Minneapolis; aged 52; died, Nov. 18, 1936, of portal cirrhosis.

**Tilman Ramsey,** Pineville, Ky.; University of Tennessee Medical Department, Nashville, 1899; member of the Kentucky State Medical Association; aged 61; died, Nov. 19, 1936.

**Simon Baer** ⊕ Galveston, Texas; Julius-Maximilians-Universität Medizinische Fakultät, Würzburg, Bavaria, Germany, 1924; aged 37; died, Nov. 17, 1936, of carcinoma of the stomach.

**Edward J. Ver Wayne,** Evansville, Ind.; Starling Medical College, Columbus, 1897; aged 62; died, Nov. 22, 1936, in St. Mary's Hospital, of chronic nephritis and myocarditis.

**John M. Taylor,** Mena, Ark.; University Medical College of Kansas City, Mo., 1898; member of the Arkansas Medical Society; aged 68; died, Nov. 15, 1936, of angina pectoris.

**Moses Aronson** ⊕ New York; Universität Zürich Medizinische Fakultät, Switzerland, 1883; on the staff of the Bronx Hospital; aged 82; died, Dec. 3, 1936, of heart disease.

**Dexter Alvin Buck,** La Porte, Ind.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1904; served during the World War; aged 66; died, Nov. 9, 1936.

**Mary Fussell Voeglein,** Baltimore; Woman's Medical College of Baltimore, 1901; aged 69; was found dead in bed, Nov. 9, 1936, of myocarditis and diabetes mellitus.

**James Haslett Thompson,** Enterprise, Ore.; Western Pennsylvania Medical College, Pittsburgh, 1896; served during the World War; aged 68; died, Nov. 20, 1936.

**Ellis L. Gibson,** Alicia, Ark. (licensed in Arkansas in 1903); member of the Arkansas Medical Society; aged 64; died, Nov. 23, 1936, of dilatation of the heart.

**Alexander Gillespie,** Edmonton, Alta., Canada; Trinity Medical College, Toronto, Ont., 1884; L.R.C.P., Edinburgh, Scotland, 1884; aged 82; died, Nov. 12, 1936.

**Frank Sandfos,** Ballwin, Mo.; St. Louis College of Physicians and Surgeons, 1894; aged 64; died, Nov. 26, 1936, in the Deaconess Hospital, St. Louis, of pneumonia.

**Norma Mabel Baldwin Kinney,** Austin, Texas; Hahnemann Medical College and Hospital, Chicago, 1905; aged 66; died, Nov. 27, 1936, of cerebral hemorrhage.

**Samuel James Morrow,** Knoxville, Tenn.; Vanderbilt University School of Medicine, Nashville, 1878; aged 83; died, Nov. 7, 1936, in the Fort Sanders Hospital.

**Edward Charles Machle,** Tacoma, Wash.; Jefferson Medical College of Philadelphia, 1889; formerly a medical missionary in China; aged 77; died, Nov. 30, 1936.

**Frank Calvin Atchison,** Norwich, Conn. (licensed in Connecticut in 1893); aged 64; died, Nov. 10, 1936, of hypertrophy of the prostate, pyelonephritis and uremia.

**Samuel Percival Terry,** Alameda, Calif.; Central College of Physicians and Surgeons, Indianapolis, 1896; aged 75; died, Nov. 6, 1936, of cerebral hemorrhage.

**Andrew Harry Clarke,** Jackson, Tenn. (licensed in Tennessee in 1889); aged 84; died, Nov. 30, 1936, in the Webb-Williamson Hospital-Clinic, of hiccups.

**Jacob Smith Petersen,** Oakland, Calif.; Niagara University Medical Department, Buffalo, 1891; aged 84; died, Nov. 18, 1936, of arteriosclerosis.

**James Alexander La Rue,** Pulaski, Tenn.; College of Physicians and Surgeons, Baltimore, 1876; aged 86; died, Nov. 24, 1936, of cerebral embolism.

**George W. Charlton,** Antioch, Tenn.; University of Nashville Medical Department, 1875; aged 85; died, Nov. 21, 1936, of pulmonary tuberculosis.

**William Irvine Hamer,** Pittsburgh; Hahnemann Medical College and Hospital of Philadelphia, 1919; aged 42; died suddenly, Nov. 17, 1936.

**David Richie Shepler,** West Newton, Pa.; Baltimore University School of Medicine, 1903; aged 59; died, Nov. 30, 1936, of coronary thrombosis.

**William Thomas Shelburne,** Indianapolis; Medical College of Indiana, Indianapolis, 1889; aged 79; died, Nov. 17, 1936, of coronary thrombosis.

**Samuel Herbert Neal** ⊕ Philadelphia; Medico-Chirurgical College of Philadelphia, 1895; aged 65; died suddenly, Nov. 7, 1936, of heart disease.

**Clement Howard Hallowell,** Billerica, Mass.; Boston University School of Medicine, 1879; aged 82; died, Nov. 13, 1936, of arteriosclerosis.

**W. R. Tennison,** Ponta, Texas; Missouri Medical College, St. Louis, 1878; aged 83; died, Nov. 12, 1936, in Summerfield, of heart disease.

**Ralph W. Van Horn,** Findlay, Ohio; Eclectic Medical Institute, Cincinnati, 1889; aged 69; died, Nov. 20, 1936, of arteriosclerosis.

**James Luther Shilt,** Dayton, Ohio; Eclectic Medical Institute, Cincinnati, 1886; aged 76; died, Nov. 7, 1936, of cerebral hemorrhage.

**Thomas T. Bays,** Hitchins, Ky.; Kentucky University Medical Department, Louisville, 1903; aged 61; died, Oct. 30, 1936.

**Harry Hewitt Hooven,** Harford, Pa.; University of Maryland School of Medicine, Baltimore, 1892; aged 67; died, Oct. 30, 1936.

**John Willis Archerd,** Crookston, Neb.; Omaha Medical College, 1891; aged 79; died, Nov. 5, 1936, of cerebral hemorrhage.

**Valentine Buechel Jr.,** Louisville, Ky.; Kentucky School of Medicine, Louisville, 1894; aged 70; died in November 1936.

**Tobias Sigel** ⊕ Detroit; Detroit College of Medicine, 1889; aged 74; died, Nov. 23, 1936, of cerebral hemorrhage.

**William James Milne,** Blyth, Ont., Canada; Trinity Medical College, Toronto, 1889; died, Nov. 4, 1936.

# Bureau of Investigation

## LINDEN RAY EMERICK, M.D.

### The Postmaster General Closes the Mails to a Diabetes Fraud

On Dec. 7, 1936, the Postmaster General closed the mails to L. R. Emerick, M.D., of Eaton, Ohio, operating a mail-order "cure" for diabetes under the following trade names: Dr. L. Emerick, Dr. Emerick, L. Emerick, L. R. Emerick, M.D., and L. R. Emerick.

Years ago L. R. Emerick was selling a booklet entitled "Dr. Emerick's Tried and Proven Formulas." The booklet was a hodge-podge of formulas for various ailments, beginning with asthma and ending with a mixture "For White Diarrhoea for Chicken," with "A Dandy Ice Cream Recipe" and "The Best for Roop" thrown in for good measure.

The Emerick treatment for "Diabetes," as given in the "Tried and Proven Formulas" (1922), consisted of tablets containing "Syzingium Jamb., 2 Gr.; Phosphoric Acid, 1-100 Gr.; Ferrum Arsen., 1-100 Gr." The instructions were: "Give one or two, 3 or 4 times a day, with avoidance by patient of foods containing starch and sugar, will certainly give wonderful results. I have cleared up every case, but one, who was too far gone when seen. This is worth $10 to any Dr." Just what Emerick thought his nostrum worth to the patient, he neglected to say.

Emerick secured his clientele by means of advertisements, and written and printed matter sent through the mails. One of the advertisements used by Emerick reads as follows:

"I HAD DIABETES MYSELF

Now enjoy the best of health, eat everything. I have successfully treated it for fifteen years. Readers of this magazine are invited to write for FREE particulars, to DR. L. EMERICK

224 N. Barron Street Eaton, Ohio

MENTION MAIL ORDER TABLOID WHEN WRITING"

If the unfortunate victim of diabetes had his curiosity sufficiently aroused to respond to the advertising "bait," he received a mimeographed form-letter reading in part as follows:

"I am glad of the opportunity to write you, for since I had Diabetes myself I can fully sympathize with one so afflicted. I am surely glad to have gotten rid of it, also glad I can help others back to the health I enjoy. For I enjoy the best of health, and have for over sixteen years. And eat everything.

"I wish to be honest with you, and will say that if you have used Insulin for several months, especially in heavy doses, you just as well go on using it. As it has been my experience that it is almost impossible to get off it. However if you have never used it, or using light doses; my treatment should prove a great blessing to you. As it has to myself, and many others some of whose testimony I am enclosing. . . .

"I am sure I can assure you help. I treat by the month, charging ten dollars a month, and I include any extra medicines needed. Most cases need something for the nerves, liver, weakness, and pain somewhere, until they get started . . ."

Dr. Emerick was not to be denied, once given a nibble. If the diabetic hesitated in parting with his cash, he received form-letter number two:

"Recently you wrote me asking about my Diabetic treatment. I sent you information of same, with some evidence of its effectiveness, and I do not understand why I have not heard from you. Surely you want to get rid of the malady . . .

"So fill out the pink slip I sent you, and let us get you started back to health. I have never had any who have regretted having taken the treatment, and I do not believe you would.

"Your health is at stake . . ."

Emerick further supplemented his follow-up letters with a partial biography of his life:

"A few words about myself—a practicing physician in Ohio for over thirty years—a graduate in 1902 from Hospital College of Medicine, Louisville, Ky.

"I, myself broke down with Diabetes and in May, 1916, had to discontinue my work and was not able to get back to my practice until August, 1918. . . .

"I appealed for help to a number of prominent physicians throughout the country without receiving any benefit or much encouragement . . .

"From the literature I gathered and by many experiments upon myself, I evolved THE REMEDY that has completely relieved me as evidenced by my coming back into practice in October, 1918, and going thru that great EPIDEMIC OF FLU . . .

"In searching medical literature I found where an old German doctor [Ye Gods! The old German doctor again!] who had been experimenting on Diabetes stated a short time before his death that he believed that if a certain preparation was given in large enough doses, that it would prove a specific in relieving Diabetes. . . ."

The treatment, according to the formula furnished by Emerick to the United States post office authorities, consisted of several packages of tablets, one marked for diabetes, the others varying according to the symptoms furnished by the patient on the "pink slip."

The alleged diabetic tablets were composed of jambul seed, 10 grains, phosphoric acid, 1/100 grain, and iron arsenate, 1/100 grain. Directions provided for the taking of two of these tablets before meals. The tablets "for weakness," according to the analysis of the Food and Drug Administration of the United States Department of Agriculture, contained strychnine sulfate, 1/60 grain per tablet, with sugar, starch and carbonate present. The tablets "for acheing" contained 4.9 grains of sodium salicylate per tablet, mixed with a small amount of starch and talc. The tablets "for liver" contained 1/500 grain strychnine sulfate and ½ grain phenolphthalein per tablet, with podophyllum and aloes present, and the tablets "for nerves" contained the fetish asafetida with magnesia and sugar present. In addition to the auxiliary tablets, Emerick furnished a so-called "Diabetic Diet."

Medical experts introduced by the government declared the Emerick "treatment" to be a haphazard collection of sedatives, stimulants and laxatives. They further pointed out that the drugs making up the "treatment" have long been known to the medical profession and have been thoroughly tested, discredited and discarded as worthless in the treatment of diabetes.

Emerick, in answer to the charges filed by Solicitor Karl A. Crowley, related a series of instances in which he alleged cures had been obtained by the use of his "treatment." In his report the Solicitor stated: "The expert evidence shows, and I do so find, that these alleged cures cannot actually have occurred."

Although Emerick advocated "To base my expectations of reward on a solid foundation of service rendered. To be willing to pay the price of success in honest effort," Post Office Solicitor Crowley recommended that a fraud order be issued against Emerick and the various names under which he sold his diabetes "cure." It was so issued.

# Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

### MOSHER PARAFFIN BASKET FOR SKIN GRAFT AFTER MASTOIDECTOMY

*To the Editor:*—In several articles on skin grafting radical mastoid cavities in recent issues of the *Archives of Otolaryngology*, mention is made of the "Mosher paraffin basket." If there is an article on the technic of this procedure, I should like to obtain it and would be pleased to hear from you in this regard.

NORMAN C. COOK, M.D., Victoria, B. C.

ANSWER.—The paraffin basket mold for applying a skin graft to the radical mastoid cavity was described in the *Transactions of the American Otological Society* in 1925. The method of making the paraffin gauze basket and the present method of using it are as follows:

A strip of ordinary surgical gauze 6 inches wide and 12 inches long is folded on its long axis toward the center twice, making a four ply tape an inch and a half wide. The gauze tape is dipped into melted household paraffin or parowax. The coating should be thick enough to obliterate the meshes of the gauze. The impregnated tape is rolled up and placed in a sterile container. Ten or a dozen such pieces of tape will last the usual operator a considerable time. These rolls become solid when the paraffin cools. It is generally easy to unwind the roll when it is wanted for use. If it does not unwind readily, immersion in warm sterile water will start it.

Suppose that the radical cavity is finished and that the operator is ready to cut his graft. The cavity is cleaned and plugged with gauze soaked with epinephrine. This is left in while the paraffin basket is being made. There is a bit of a trick in making the cone. A strip of tape is cut 6 inches long. This is made to loop over the right index finger of the surgeon tent fashion, the ends of the tape diverging and making a V.

Then the index finger is given a half turn forward. This results in a spiral twist and the formation of a cone. The twisted cone is then cut free from the tape. In twisting the cone there should be ample overlapping so that the cone can be made wider if necessary. The overlapping edge is smoothed down until the joining disappears and a smooth surface results. When the cone is placed in the radical cavity to make the mold, the overlapping edge is placed posteriorly so that it lies in the bowl. The tip of the cone is filled with melted paraffin for about a quarter of an inch. It is easy to scrape enough paraffin for this from the waste ends of gauze. The object of the solid tip is to make an accurate mold of the middle ear and the region of the aditus. If the meshes of the gauze show on the surface of the cone, the cone should be dipped in melted paraffin. The longer the operator intends to leave the mold in place, the more care he should take to have a thick coating; because if the gauze becomes exposed, as it did in one case in which the mold was left in three weeks, the mold changes into a gauze plug, starts up granulations and defeats the purpose of the whole procedure. The cone made, the epinephrine gauze is removed from the radical cavity and the paraffin cone placed in it. The handle of the ordinary searcher is used to tampon the cone into place and to make it fit all parts of the cavity, especial care being taken to get an accurate fit in the middle ear. If the meatal flap has not been cut, this is now done. Dr. H. P. Mosher, after much experimenting, has returned to the old Koerner flap. In one case after this flap was made it was cut off and the result was just as good as in the cases in which the meatal flap was left. The mold made, it is left in place for hemostatic purposes while the graft is being cut. The mold is so easy to make that it is worth while to make a second one, perhaps not so carefully as the first, and to leave this in place while the graft is being cut. It takes a minute at least to arrange the skin graft nicely on the mold and, while this is being done, the radical cavity more or less fills with blood and has to be wiped out again. By using two molds, this can be prevented. Experience has shown that it is important to have the mold trimmed flush with the surface of the mastoid and not project. If it does, it interferes with the obtaining of primary healing. If a meatal flap is used, it is tucked in place back of the mold and the cavity of the mold is filled with ordinary gauze. The mastoid wound is closed for its whole length. If the operator prefers, the lower half of the incision can be left open and a drain inserted. If this is done after the drain and the mold have been removed the unsutured part of the incision falls together and heals promptly. It is well to leave the mold in place from five to ten days. As long as the incision does not become puffy or red, in other words, when primary healing goes on smoothly, it is a sign that the mold is being well tolerated. If much discharge appears at the meatus, this is a sign that the mold should be removed. As was pointed out before, if the mold is left in long enough for the wax to be melted away sufficiently to expose the gauze, the purpose of the mold is defeated.

When it is decided to remove the mold, the gauze that is packed into the cavity of the mold is taken out and then the sides of the mold are collapsed on each other and the mold is taken out. Usually the skin graft is left behind and adherent to the sides of the radical cavity. It is a great satisfaction to see the graft left behind and fitting snugly in place. It is a great contrast to what happens when the gauze plug for carrying the graft is used.

When the mold was first used, Dr. Mosher left the incision open and drained for its full length, closing the incision secondarily. Next he closed the upper half of the incision and drained the lower half. It was found that the lower half of the incision would close of itself. Dr. Frederic L. Bogan proved that, if the edges of the mastoid mold are trimmed flush or a little below the surface of the mastoid cavity, primary union can be secured in most cases. In the early days of experimenting with the mold it was made of solid paraffin and was removed through the postauricular incision. The basket mold can be easily removed through the meatus.

## PREGNANCY AND PERNICIOUS ANEMIA

*To the Editor:*—Please advise as to the treatment and prognosis of a patient with a moderate degree of pernicious anemia who is six months pregnant. De Lee says "Pregnancy should be terminated as soon as the diagnosis is made." HARRY F. WATT, M.D., Ocala, Fla.

ANSWER.—True pernicious anemia is rare during pregnancy but a "pseudo pernicious anemia" in its milder forms is observed occasionally. The mildest or hypochronic anemia is rather common. Esch reports six cases of pseudo pernicious anemia which he thought were toxemic in origin. If there are heart murmurs, leukocytosis and fever, one should think of endocarditis. After a positive diagnosis of true pernicious anemia has been settled, the treatment is as usual. Increased doses of liver extract should be given intramuscularly, enough to keep the blood count well above normal, and 7 Gm. of iron as ferrous carbonate or ferric ammonium citrate daily added if necessary. One might add vitamins A and C to the diet.

If the blood examinations of this patient show no improvement or a deterioration, the pregnancy should be terminated.

In this case it might be possible to tide the patient along at least to viability of the child and, if improvement is evident, even to term.

## MALIGNANT HYPERTENSION

*To the Editor:*—A white man, aged 46, has been suffering from what is said to be "kidney trouble and high blood pressure" for the past six or eight weeks. His past history is negative. His father, aged 69, has been suffering from hypertension for a long time, probably of arteriosclerotic origin. At the time he consulted a physician he noticed that he became tired easily and felt weak in his legs after climbing the subway stairs. Later on he complained of headache and pain in the suboccipital region (having slept well he awoke with severe headache and pain behind the eyes, for which Bromo-Seltzer had been the only remedy). He had had probably all kinds of medicine and a strict diet, mostly vegetarian and salt free. April 3, the urine examination revealed a small amount of albumin, no sugar, no acetone, from 1 to 2 leukocytes per high power field, and 12 hyaline, 3 moderate granulated and 4 epithelial casts. About five days ago I was called, because the patient had become very ill, had vomited everything he had taken, suffered from constipation and had a terrible headache. I found him in bed, apparently ill; his face was pale with a tinge of gray and there was some degree of apathy but no cyanosis or dyspnea. His temperature was normal. The tongue was slightly coated. There was no specific fetor. The lungs were normal. The heart was enlarged to the left one fingerbreadth. The apex beat was markedly accentuated. There were no murmurs. The pulse rate was 80; the pulse was regular and equal. The blood pressure was 215 systolic, 155 diastolic, 260/155 and higher than 260, although the patient did not move. The abdomen was normal; there was no ascites. The extremities were normal. There was no edema. The reflexes and pupils were normal. Except for an enema, I did not suggest any medication or food intake. On the following day he felt somewhat better. I took about 60 cc. of blood. The blood and the urine were tested. Nonprotein nitrogen was 25.2 mg., urea nitrogen 12 mg. The urine contained a heavy deposit of albumin; its color was light amber; it was acid in reaction and the specific gravity was 1.019. There were no traces of sugar or acetone. Hyaline, finely, coarsely granular and pus casts numbered 40 to 50 per field (one-fourth inch objective), red blood cells 60 to 75 per field, white cells 100 to 125, and there were a few flat and renal epithelial cells, a large amount of mucus, and amorphous urates. The Wassermann and Kahn tests were negative. To be on the safe side, I gave the patient a vegetarian, salt-free diet with plenty of potatoes, as though to combat "acidosis." His condition improved. He is no more in a stage of apathy. His appetite is improving. He has not vomited since. Two days ago I took blood again (about 100 cc., as for some reason I could not take from 200 to 250 cc. as intended). The patient stated on this occasion again that he felt some relief soon after that, especially in the head. As he cannot stand the sight of blood, he almost faints. The blood pressure is then lower, about 170/120, but naturally goes up again as soon as the patient regains full consciousness. At the last phlebotomy the diastolic pressure dropped for the first time to 130 and remained as low. There seems to be no renal insufficiency, as the intake of fluid (restricted to one quart) equals almost the output. There is no nocturia. The symptoms pointed to uremia. What puzzled me and still is puzzling me is that uremic symptoms should occur while the nonprotein nitrogen and urea nitrogen were normal the day after. I was thinking of nephrosclerosis, although the high amount of albumin is mostly not found in this disease. On the other hand, malignant nephrosis does not fit into the picture either. Would you kindly advise me as to the diagnosis and outline a treatment; namely, whether it is advisable to add salt to the diet and by what means I should try to lower the blood pressure and what to do to make the albumin disappear gradually? Pleast omit name. M.D., New York.

ANSWER.—The clinical picture described of marked arterial hypertension, cardiac hypertrophy and severe headaches in a man of 46 suggests inclusion in the group designated "malignant hypertension," because of its grave prognosis. Examination of the eyegrounds might furnish information of value. Whereas the condition may have originated as an essential hypertension, it has evidently progressed to an arteriosclerosis. The kidneys are evidently involved to some extent, but the absence of nitrogen retention speaks against uremia as the cause of the recent accident. There remains to rule out a cardiac or cerebral accident. Coronary sclerosis with occlusion of a small branch has not been entirely ruled out although the pulse rate was normal, dyspnea absent and the blood pressure high. An electrocardiogram would be of value. A cerebral accident seems most likely in view of the preceding headaches and relief when the high blood pressure was lowered. As regards treatment, prolonged bed rest and adequate venesection seem clearly indicated. A balanced diet with sufficient protein to meet his

requirements is suggested. Restriction of fluids does not appear necessary, but elimination of table salt seems desirable. As for drugs that might have an effect in lowering the blood pressure, one hesitates to suggest sedatives in the absence of knowledge as to the patient's nervous state, or such preparations as nitrites or potassium iodide.

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### PREGNANCY AND HYPERTHYROIDISM

*To the Editor:*—Kindly suggest the management of a primipara, aged 25, six months pregnant, who has asymptomatic signs of hyperthyroidism; i. e., an enlarged goiter, tachycardia (a rate of 120), increased blood pressure (160 systolic, 70 diastolic), tremor, underweight, normal urine and a negative blood Wassermann reaction. Administration of aqueous solution of iodine produced no change. What treatment should be given during pregnancy? What anesthetic and/or analgesic should be chosen during labor? Is chloroform harmful here? What is the postpuerperal treatment for the hyperthyroid condition, medical if possible? Is a basal metabolism test absolutely necessary in view of the conditions found. Please omit name.

M.D., New York.

ANSWER.—Before an attempt is made to offer suggestions for the management of this particular case, it might be well to refer to some data that appeared in an article published in 1931: Twenty-nine cases of exophthalmic goiter, and twelve cases of adenomatous goiter with hyperthyroidism associated with pregnancy were reported; these cases had been observed during the period beginning in January 1923 and ending in January 1930. The symptoms in five (17 per cent) of the cases of exophthalmic goiter and in six (50 per cent) of the cases of adenomatous goiter with hyperthyroidism were aggravated during pregnancy prior to the inception of treatment. In twenty-two of the twenty-nine cases of exophthalmic goiter, partial thyroidectomy was performed during pregnancy. In the remaining seven cases of exophthalmic goiter the patients were carried through pregnancy on aqueous solution of iodine. In those cases in which thyroidectomy was performed, aqueous solution of iodine was administered for some time prior to thyroidectomy, but iodine did not sufficiently control the symptoms to warrant deferring operation until after labor. In nine of the twelve cases of adenomatous goiter with hyperthyroidism, thyroidectomy was performed during pregnancy. There were no deaths from thyroidectomy in the whole series, and all the patients reported relief or improvement of symptoms. Miscarriages were not reported in either group.

In conclusion, the authors made the following summary: "Evidence indicates that hyperthyroidism resulting from adenomatous goiter is not satisfactorily controlled by iodine and that it is safer to remove the adenomatous tissue if this condition is present. The use of aqueous solution of iodine in doses of 10 drops three times a day, in cases of exophthalmic goiter, should be followed by distinct improvement and a definitely lowered basal metabolic rate within two weeks. In the occasional case of exophthalmic goiter, within two weeks after the use of iodine, a remission may follow which is complete or nearly complete, with the basal metabolic rate approximating normal or within normal limits. In certain cases of such rapid and marked remission of the disease, the patient may be carried successfully through pregnancy by the administration of iodine, without resort to thyroidectomy. Patients must be observed carefully, however, and determinations of the basal metabolic rate must be made occasionally, as recrudescence of the disease often occurs in spite of the continued use of iodine. In the medical treatment of exophthalmic goiter in which there is marked response to iodine, the attending physician may acquire a false sense of security, which results in operation being deferred to a less favorable period in pregnancy or to a time when iodine may fail to give as complete protection against postoperative reaction. Except in certain cases in the later months of pregnancy, partial thyroidectomy should be performed without delay if the exophthalmic goiter does not show complete or nearly complete remission within two weeks after the institution of treatment with iodine; delay may be followed by irreparable injury to vital organs. There may be exceptions to this rule in cases in which complicating conditions other than normal pregnancy exist. In cases of exophthalmic goiter and of adenomatous goiter with hyperthyroidism in which operation is or is not performed, aside from the judicious use of iodine the treatment is the same as that usually given to women during pregnancy and confinement. When the strength of the patient is diminished or the heart is injured as a result of the severity of the hyperthyroidism, it may be necessary to shorten labor by forceps or version or, rarely, by cesarean section."

The data presented in the article referred to and the authors' summary will serve as a guide in the management of the case under consideration. Determinations of the basal metabolic rate should be made from time to time as an aid in diagnosis and in determining the advisability of thyroidectomy. It should be remembered, however, that even in the absence of hyperthyroidism an increase in the basal metabolic rate begins about the fourth month of pregnancy and rapidly increases, particularly during the last three months. At the end of pregnancy the rate may be from 20 to 25 per cent above the Du-Bois standard if calculated in the ordinary manner without allowing for the development of the fetus. Therefore, a basal metabolic rate of +25 or even +30 is not necessarily an indication of hyperthyroidism in the latter months of pregnancy.

In cases in which hyperthyroidism is associated with pregnancy, pentobarbital sodium, 3 grains (0.2 Gm.) orally, may be administered as an analgesic in the early part of the first stage of labor, but it is usually inadvisable to give more than a total of 6 grains (0.4 Gm.) during this period of labor. Morphine, ⅙ grain (0.01 Gm.), may be given hypodermically if it is not given within four hours of actual labor. Chloroform should not be used in this type of case during labor; nitrous oxide and oxygen is the anesthetic of choice.

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### TREATMENT OF GONORRHEA

*To the Editor:*—I have a patient who came to me with the usual symptoms of gonorrheal infection although the story was that the condition was due to a "strain from horseback riding." The smear taken at the first visit was reported "positive" for specific organisms and treatment was immediately started with the filtrate of Corbus-Ferry. Subsequent treatment consisted of daily irrigations with neosilvol solution and weekly injections of the filtrate. Twenty filtrate injections were given in all, the dose varying from 0.05 to 0.1 cc. intradermally. Smears taken at these weekly intervals were negative for gonococci until the eighth week, when it came back positive. Treatments were continued as before with prostate massages begun at this time, a few drops of a milky secretion being obtained at each of these visits. For the next eight weeks the smears remained negative but the eighth was again positive. Treatment continued as before, but after the twentieth filtrate injection these injections were discontinued. The prostatic smears came back negative but always had "a few leukocytes," and the morning drop also continued. After eleven more weeks the patient contracted a prostatitis, caused perhaps by sitting on cold and damp ground. The gland became hard, swollen and tender. Hot sitz baths relieved the pain and pressure in the perineum but the discharge started up profusely and was again positive for gonococci. The patient has had twenty-six weeks of treatment, twenty of which consisted of filtrate injections with the neosilvol washes and the use of methenamine and copaiba-methylene blue combinations alternating orally. On the twentieth week he complained of splitting of the stream and frequency. Feeling that there must be a stricture, I dilated the urethra on two successive weeks with No. 11 and 13 English sounds. Adequate sterilizing precautions were taken and this condition has improved. Treatment has certainly been adequate, perhaps too adequate, for this to be cleared up by now and I should like to know what measures I might take to cure the condition. He wishes to get married as soon as possible but not before he is perfectly "healthy," and I want to be able to reassure him that he has recovered. He has followed treatment very well and has avoided all sexual exercise and other deleterious practices and I feel that something is amiss although I cannot put my finger on it. I feel that the filtrate in this instance has proved bacteriostatic but not bacteriocidal and that it merely held up the discharge as long as he was receiving the injections. I am now giving irrigations with neosilvol and also using four irrigations daily of zinc sulfate 10 grains (0.65 Gm.), diluted solution of lead subacetate 4 ounces (120 cc.) and water to make 8 ounces (235 cc.) following urination in an attempt to dry up this discharge. Please omit name.

M.D., Massachusetts.

ANSWER.—This patient most probably has his gonorrhea from a persistent focus in the prostate and vesicles and from overzealous therapy. If the patient has two cloudy urines he should be treated twice a week with gentle massage of the vesicles and prostate. The force of the massage may be gradually increased but should never produce real pain, only the discomfort usually associated with this procedure. After each massage a 5 per cent solution of mild protein silver should be instilled through a catheter into the posterior urethra. The anterior urethra can be medicated as the catheter is being withdrawn. Should the cloudy urines contain considerable flakes of exudate, it is usually beneficial to substitute a through and through irrigation of 1:5,000 potassium permanganate solution for one of the instillations. The irrigator containing the permanganate solution should not be more than 3 or 4 feet above the patient. This procedure should produce no pain, otherwise more harm than good will result. After the prostatic and vesicular secretions improve and the urine gets fairly clear and contains only shreds, the treatment is again altered. In place of two massages the patient is treated with a sound at one visit and is massaged the next. Following these procedures the urethra should receive a through and through injection of mild or strong protein silver in the strengths mentioned. The dilation should be begun at 23 or 25 F., depending on the size of the meatus. The size

should be increased 1 F. weekly, provided no undue trauma has been produced by the preceding instrumentation.

If a 26 F. cannot pass the meatus, a urethral meatotomy should be performed and the dilatation increased to from 28 to 32 F.

No more vaccines should be given.

For treatment at home the patient should inject the anterior urethra with 5 cc. of a 5 per cent neosilvol solution twice daily. When the smears and shreds have become negative, the treatment should be tapered off and the condition provoked with silver nitrate beginning with 0.125 per cent increasing to 0.25 per cent. If smears remain negative for from six to twelve months with checks at intervals of from three to six weeks, cure probably has occurred.

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### HYPERPERISTALSIS WITH BORBORYGMUS

*To the Editor:*—I have had under observation for the past several years an intelligent young business executive whose chief complaint is indigestion and flatulence. After thorough physical examination, together with laboratory work and a gastro-intestinal series, revealed nothing abnormal, a diagnosis of nervous indigestion was made. The underlying condition was explained to him and he was given appropriate matter on the subject to read. With an excellent insight into the subject he adjusted himself well, performing his work efficiently despite his handicap. Recently, ignoring my advice, he accepted a better position with another firm entailing many more responsibilities than he formerly had and after a period of about six months, when he felt he was becoming well adjusted to his new work, hyperperistalis of the small intestine set in with resultant loud rumbling and gurgling sounds emanating from the abdomen. After a meal this condition would begin and continue almost until the time for the next meal, when the process would be repeated. He learned to control it somewhat by eating small meals, but there was a resultant loss of weight. He is now back at his original position, but after a year the syndrome of hyperperistalis is still dominant, although diminished somewhat in intensity. Reexamination, together with basal metabolic rate determinations, laboratory work and a gastro-intestinal series, shows nothing of significance. His home life is ideal and he has no financial worries. He is clamoring for relief not from any subjective symptoms, to which he has become inured, but from the embarrassing sounds induced by the hyperperistalsis, which greatly hinder his efficiency and usefulnes and prevent him from making the contacts he would like. Sedatives are of no avail, for enough to cause drowsiness must be taken before the abdominal condition is controlled. I have tried atropine and the newer synthetic preparations said to be useful in relaxing smooth muscle, but all have proved of little value. Various types of diet have been resorted to without much success. His appetite is good, as is his general condition. Consultants agree as to the cause but have not been able to offer suggestions of any great value. What is the possibility of this condition clearing up as far as the hyperperistalsis syndrome is concerned? Am I justified in recommending splanchnic resection in a case of this type, in which the exaggerated gastro-intestinal behavior dominates the picture to the exclusion of all else? I would appreciate any suggestions as to prognosis and treatment. Please omit name.

M.D., Louisiana.

ANSWER.—There can be little question about the functional nature of the trouble, especially when the symptoms run on for a year or more. One can then exclude an obstructing lesion in the small intestine, because persons with such lesions are generally forced to operation within six months. As the correspondent says, the difficulty comes when one tries to cure the condition. Theoretically the prescription most likely to give results would be one for a long vacation. With these cases, drugs and diets are of little avail. Even fasting cannot help much, because in both animals and men the activity of the empty bowel is sometimes even more boisterous than that of the digesting bowel, much as the gastric hunger activity is often more striking than that seen when the stomach is full.

Section of the splanchnic nerves is contraindicated because in both animals and man it is likely to be followed at least for a time by increased activity of the bowel. After double splanchnicotomy the rabbit usually dies of diarrhea and inanition, but cats, dogs and men are better able to stand the release of inhibition which comes with degeneration of the sympathetic nerves.

One can hardly hope to quiet the gurgling bowel by removing nervous influences because of the experiences of men like Sinelnikoff who, in the case of a young woman who had swallowed lye, transplanted a piece of jejunum out under the skin of the chest so that it could be used as an esophagus. Two years later the rhythmic contractions of this denervated segment were even more powerful than they were to begin with. Actually, what seems to be needed by the persons with an overactive bowel is more nervous control rather than less.

In one case, intestinal gurgling became so distressing and painful during the course of several years that the patient was disabled. Two explorations of the abdomen revealed no cause for the trouble. Because the trouble was limited to the right side of the abdomen and because it had resulted in such disablement, the attending physicians in desperation had the three right splanchnic nerves sectioned and the first and second lumbar sympathetic ganglions removed. The patient is somewhat worse, and the probability is now that section of the nerves on the other side would make her worse yet. In this patient there are several signs of Cushing's basophilic syndrome but it is hard to say what this has to do with the rumbling. At the time of exploration the right adrenal gland was found to be normal. It is probable that the severe disturbance in the glands of internal secretion is responsible for the nervous condition of the patient, which again may well be responsible for the overactive and oversensitive bowel; but the gurgling disease is so rare that no one can yet say what belongs in the syndrome and what doesn't.

The prognosis is not hopeful, because some of these people tend to get worse as years pass, especially if they cannot afford to take the long rest which alone will tone up the nervous system.

To make certain that there is no causative element in the diet, it might be well to keep the patient for two or three days on nothing but maple sugar, or perhaps lamb and rice, to see if here is any improvement. In one case the patient, a physician, discovered that blackberry cordial would give relief. In some cases the patient is helped if, before going out to dinner or to some function where he wishes to be on his good behavior, he takes 0.03 Gm. (one-half grain) of codeine sulfate. Another drug that might perhaps be tried is the supposed sympathetic sedative ergotamine tartrate (to be used only occasionally). According to recent papers by Cannon and Rosenblueth, yohimbine and piperidinomethyl benzodioxane (see a series of papers published in 1936 by Bovet and others from the Pasteur Institute) are the best two drugs with which to block the effects of stimulating sympathetic nerves. Theoretically, however, to quiet the bowel one should give a sympathetic stimulant or mimetic, the most powerful being epinephrine; but the action of this drug is transient and is likely to be followed by excess activity of the bowel. A more prolonged stimulation might perhaps be obtained with benzedrine.

In some of these cases of gurgling the physician must wonder whether the borborygmus is any worse or more noisy than that present in many uncomplaining persons. In such cases the trouble is probably due to the same type of hypersensitiveness or abnormal awareness of normal bodily functions that causes persons to complain of the heart beat or of floating specks before the eyes. Obviously, in such cases the treatment must consist of reassurance and very tactful argument.

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### SWELLING OF THE LEGS

*To the Editor:*—I have a patient who first consulted me a few days ago with bilteral swelling of the legs, particularly from the knees to the ankles. The condition has been present for twelve years. She is now 32 years of age. She was recently married and has had only one pregnancy, which was uneventful. The child is nearly 2 years old. The legs are slim and natural in the mornings but are much worse at night; they were better during her pregnancy, however. The patient suffers from constipation but complains of no other symptom except a heavy weighted feeling in the lower part of the legs. The blood pressure is 125 systolic, 80 diastolic. The heart is normal. Can you give me any suggestions as to the cause and treatment of such a case? I have been treating the constipation for just a few days so far; and have advised Ace bandages as a temporary support. These, however, make deep impressions in the leg by bedtime. Thank you for your help; if this should be put in THE JOURNAL, please omit name.

M.D., District of Columbia.

ANSWER.—In general there are four kinds of diffuse swellings of the lower extremities: (1) that resulting from disturbed function of distant organs, such as diseases of the heart and kidneys; (2) that due to impaired lymphatic circulation; (3) that due to impaired venous circulation, and (4) that associated with excessive adiposity. The early history of the swelling is important in arriving at the diagnosis. One needs to know whether or not the swelling began simultaneously in the two legs, whether or not it came on suddenly, and whether or not it was associated with pain or fever. It is important likewise to know whether or not there is excess adipose tissue in the lower extremities and whether or not varicose veins are present. A good deal of help from a diagnostic standpoint can be obtained by observing the texture of the skin. In lymphedema it ordinarily loses its smooth texture. In the case under consideration it is probable that the swelling came on simultaneously in the two extremities and was not associated with pain or fever. If disease of the heart and kidneys and hypoproteinemia have been excluded, the swelling is probably associated with excessive adiposity of the lower extremities or due to impaired lymphatic circulation. If the edema can be demon-

strated to arise from local causes only, it is important that it be controlled. It is apparent that the Ace bandages are inadequate for this purpose. It is well to try next good grade elastic stockings, for which measurements are taken when the extremities are free of edema. If these do not control the swelling, it is advisable to use a pure rubber bandage which is 3 inches wide and 15 feet long. These bandages can be secured in three weights, and it is probable that the lightest one would be satisfactory. Discussion of the differential diagnosis of swelling of the extremities, and instructions for the use of bandages is available (*Ann. Int. Med.* **9**:516 [Nov.] 1935).

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### CARE OF DISCHARGE IN OTITIS MEDIA

*To the Editor:*—Some nose and throat men say that a discharging ear should not be irrigated because it might produce a mastoiditis, while other nose and throat men say that the canal should be irrigated or washed out. What is the right or proper thing to do? Is it proper to put anything into the discharging ear or not, and if so what is the best remedy? Would the instillation of five drops of alcohol three times a day be indicated and would it be as good as almost anything else one might instil into the ear? I am a general practitioner and I was taught to use heat in all cases of mastoiditis, especially moist heat, such as hot epsom salt compresses. I was instructed never to irrigate a discharging ear but to leave it alone and let it discharge. Please omit name.

M.D., New Jersey.

ANSWER.—In the presence of an acute otitis media the discharge in the external auditory canal may be treated either by the dry method—mopping it up with absorbent cotton—or by the wet method—flushing the canal with some mild antiseptic fluid such as a saturated boric acid solution.

In acute suppurative otitis media the pathologic condition is such that it is not likely that any of the irrigating solution will enter the middle ear; hence the fallacy of using highly recommended expensive antiseptics. The irrigation is merely a mechanical method for obtaining the result desired. The situation is entirely different when one deals with a chronic suppurative otitis. In chronic suppurative otitis, cholesteatoma is frequently present. Watery solutions in the external auditory canal may enter the middle ear and cause the cholesteatoma to swell, and occasionally under such circumstances serious if not fatal complications may result. Hence aqueous solutions are forbidden according to the best teachings.

If the discharge in the presence of chronic otitis media is such that irrigations are deemed necessary, one should use alcohol solutions. Alcohol is a dehydrating agent and will not cause the cholesteatoma to swell, provided the concentrations used vary from 60 per cent upward. It is perfectly proper, however, to use alcohol drops in the presence of chronic suppurative otitis media, and they may also be used in the last stages of acute otitic suppuration. It seems clear that the statement that a discharging ear should never be irrigated is not altogether true. Within the limitation given, it is perfectly proper to wash out the external auditory canal.

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### REGROWTH OF PROSTATE AFTER ENUCLEATION

*To the Editor:*—A man, aged 70, has occasional painless hematuria. He says that he had an enucleation of the prostate fourteen years ago. The surgeon is now dead but his son, who is carrying on the practice, reports two other cases that his father had treated with enucleation, in men younger than the average prostatic patient, who have returned to him with benign hypertrophies after ten and eighteen years respectively. On physical examination of this one patient I find a smooth, hypertrophied left lobe and a smaller and somewhat roughened right lobe, with slightly increased density. A 15 ounce residual urine was found, a soft rubber catheter having been introduced without difficulty. I have attended this patient for the past eight months, during which time he has had a bronchopneumonia with apparent complete recovery, followed by hemorrhage from a peptic ulcer. The latter condition has progressed satisfactorily to date. Can you give me any information regarding regrowth of the prostate? Do you advise enucleation at this time? Your comments on this subject would be greatly appreciated. Please omit name.

M.D., New Hampshire.

ANSWER.—Regrowth of the prostate gland following its surgical removal is not at all uncommon. It is usually impossible to remove all the prostatic tissue at operation, and hyperplasia of the remaining tissue occurs to a varying degree in a large number of cases. As a rule the regrowth is slight and causes no symptoms, but evidence of postoperative urinary obstruction is noted in possibly 5 per cent of cases. Usually such obstruction does not take place until ten or fifteen years following enucleation, and it occurs more frequently in patients who were under 60 years of age at the time of operation.

Removal of the prostatic obstruction is undoubtedly indicated. With perfection of the methods of transurethral resection there is no reason why another enucleation should be performed in this patient. A transurethral resection, if done by a man who has had considerable experience in this field, should be accompanied by comparatively little risk to the patient, and the function of his bladder should be restored to normal. Curiously enough, transurethral resection has been inadequately developed in some sections of the country. However, the excellent results which usually follow this operation make it the method of choice.

Before anything is done, an examination should be made to determine the cause of the patient's painless hematuria. Although hematuria is often of prostatic origin, the possibility of a neoplasm or possibly a nonopaque calculus in the bladder cannot be excluded without cystoscopy. If there are clinical data which would suggest that the hematuria might be of renal origin, an excretory urogram or, better, a retrograde pyelogram will usually exclude this possibility.

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### CHRONIC PROSTATITIS

*To the Editor:*—A white man, aged 24, became infected with gonorrhea seven years ago. He received treatment at that time, consisting of "pills" orally and self hand injections once daily for four months until the discharge ceased. For the next three months he received prostatic massage. No sounds were used. The patient was told that he was cured. Three years later he married. About one year after marriage, or after four years of being symptom free, he had a recurrence of the white penile discharge. He went to another physician and was treated for one month by means of intra-urethral self hand injections. At the end of one month the discharge stopped and his physician said that the discharge "would dry up." A smear at this time showed few pus cells and no organisms. The patient was symptom free for the next two years, when he again developed a urethral discharge. He went to another physician, whose treatment was the same as that described but in addition he passed sounds about three times. During this treatment a left cervical abscess developed. While the patient went to the hospital for treatment of this condition the urethral discharge persisted for the next two months. After leaving the hospital he resumed his gonorrheal treatment, which lasted several months until October 1935, when the discharge from the urethra ceased. A smear at that time showed nothing. The patient was then symptom free until February 1936, when he consulted me. At that time a urethral discharge developed. A smear showed only a few pus cells and no organisms. During my treatment, which consisted of prostatic massage and the passage of sounds with instillations of 1 cc. of 0.5 per cent silver nitrate into the posterior urethra through an Ultzman tube, the discharge has stopped. The discharge is present only after prostatic massage. The prostate is normal in size and is not tender. He has refrained from the use of alcohol but continues his sexual relationship. I would greatly appreciate it if you will criticize this case from beginning to end and offer your opinion as to any further procedure to be taken. The patient's wife has not developed any symptoms referable to gonorrhea. Please omit name if printed.

M.D., New York.

ANSWER.—A recurring urethral discharge of this type usually has its origin in a chronic infection of the prostate gland. The possibility of recent reinfection, of course, is not excluded. Bacterial study of a discharge persisting many years after an initial gonorrheal infection seldom reveals the presence of Neisseria gonorrhoeae. In order to make certain, however, it would be well to take cultures of the discharge for Neisseria gonorrhoeae, since recent technical advance in its culture has made this method remarkably accurate.

Chronic, recurring infection of the prostate gland may be difficult to eradicate. A thorough and repeated study should be made of the prostatic secretion, note being made of the cellular contents as well as gram stains and cultures. Although only a few pus cells may be found on preliminary massage, subsequent massage may disclose evidence of considerable prostatic infection. A course of vigorous prostatic massage over a period of two or three months would then be indicated. Dilating the urethra with sounds and deep urethral injections may also be employed. Although chronic prostatic infection is probably favored by a previous gonorrheal infection, it occurs fully as often without such involvement. Chronic prostatitis may be secondary to infection elsewhere, as in the teeth and tonsils. It would be advisable to search for such foci and remove them if found.

If the discharge persists in spite of the treatment suggested, it would be advisable to make a cysto-urethroscopic examination in order to exclude first the possibility of infection in the upper urinary tract and also to localize the condition of the prostatic urethra. If dilated ducts exuding purulent secretion are seen in the prostatic urethra, this would indicate active prostatic infection and the possibility of a duct abscess. If evidence of a localized abscess is found, transurethral incision of the ducts would be indicated. If no surgical condition is found and

the prostatic infection persists in spite of thorough treatment, intraprostatic injection of antiseptic solutions such as mercurochrome might be considered.

### HEMOLYTIC JAUNDICE IN PREGNANCY

*To the Editor:*—A woman, aged 22, height 66 inches (167 cm.), weight 130 pounds (59 Kg.), with no history of previous illnesses and of excellent physical type, has had a normal pregnancy for eight months. Pain over the gallbladder began Jan. 1, 1936, and has increased in intensity with no relief except narcotics. Albumin in the urine was detected January 15, with hypertension. She was taken to a hospital for observation. Jaundice developed. There were no convulsions. January 20 a normal delivery occurred. Six hours later there were all the symptoms of a severe hemorrhage. The patient was almost moribund, with no bleeding and a firm uterus. Blood count revealed 1,500,000 red cells, 11,000 white cells and hemoglobin 30 per cent. The jaundice had cleared, but the diagnosis in retrospect specified the hemolytic form. Two full sisters, who are living and well, have never been pregnant; one half sister on the paternal side with two children and one half sister on the paternal side died with eclampsia and jaundice; one aunt on the paternal side died with eclampsia, the jaundice condition unknown. There is no other pertinent family history. The patient is now again pregnant with March 13 as the date of the last period. She asks for the best advice. She is anxious for a child if it is best to carry on. I have never before had hemolytic jaundice with pregnancy and request information as to the likelihood of recurrence in successive pregnancies from the history of similar cases. Her condition now is excellent. The former infant died February 2 from apparent toxemia. Please advise me what is best to do. M.D., Iowa.

ANSWER.—Hemolytic jaundice is extremely rare in pregnant women, and when it occurs it is usually linked up with the toxemias of pregnancy, although the exact etiology is unknown. The family history in the present case points to a tendency for the relatives on the paternal side to develop toxemia during pregnancy. Nearly all attacks of hemolytic jaundice are serious, some critical and a few fatal. It is difficult to prognosticate what will happen in the present case. Attacks of hemolytic jaundice frequently recur. An important factor to consider is that the disease may be transmitted to the baby. Perhaps the first child died of the disease a few days after birth. In view of these facts, it may properly be suggested to the patient and her husband that the present pregnancy be interrupted, provided the diagnosis of hemolytic jaundice is correct in the present case.

### DIFFERENTIAL DIAGNOSIS OF GASTRO-INTESTINAL CONDITION

*To the Editor:*—A single woman, aged 22, complains of the following symptoms extending over a period of two years. The condition is much more pronounced in the summer and she goes three or four months in the winter free from trouble. In the early morning she usually wakes with a gnawing in her stomach. Immediately after breakfast she has pain in the abdomen followed by from one to four yellowish watery stools. Her description is that she gets no relief until her breakfast passes from the body. Sometimes these stools are not associated with pain. The stools are watery, sometimes lumpy, with no marked odor. Diet does not affect the condition. She has been on diluted hydrochloric acid, camphorated tincture of opium and emetine hydrochloride, hypodermically at different intervals with no relief. Thank you for any suggestions you have to offer. M.D., North Carolina.

ANSWER.—It is difficult to make much of a guess as to the nature of this woman's difficulty, and the diagnosis might be just as obscure after one had made the most careful study possible of the digestive tract and the stools. Years ago, with such a story, one would think first of an achlorhydria, but it is known now that achlorhydric diarrheas are rather rare, and this patient has not responded to the giving of acid.

It would be well to have the stools searched for parasites by an expert. It is possible that she has a chronic infection with one of the several organisms that can produce a recurrent dysentery.

Both the small intestine and the colon should be examined with x-rays and the patient should have a sigmoidoscopic examination to make sure that there are no signs of ulceration in the lower bowel. It would be interesting to see if there is free acid in the stomach. If there is some, that will also help to rule out a beginning pernicious anemia.

We assume that the patient has not at any time submitted to gastro-enterostomy or to any abdominal operation supposed to be a gastro-enterostomy.

It would be well to see whether the patient is sensitive to certain foods. The fact that the trouble comes in summer suggests that she is sensitive to one or more fruits. She might stay for a while on the type of diet which she follows in the winter. If that should bring relief, the offending foods could easily be discovered by testing one at a time.

The supper incidence suggests also that she is sensitive to bacteria that multiply in milk, ice cream, meat (especially hamburger steak) and other foods in hot weather.

Emotional causes for diarrhea must never be forgotten, nor must it be forgotten that the milk given by way of treatment may be a cause. An elimination diet of lamb and rice might be tried for a few days to see if it brings relief. One might try the giving of calcium gluconate, also a low-fat diet.

### PRIAPISM

*To the Editor:*—I have a patient 60 years of age, in good health, who complains of uncomfortable penile erections, which appear each night at about 3 a. m. They always wake him and he can obtain relief only by assuming certain postures. He states that he loses from one to two hours sleep and feels exhausted afterward. These symptoms appeared gradually about four years ago. He thinks that their origin may be in some way connected with an extramarital liaison which existed at about this time with a woman who was almost pathologically libidinous. This relation existed for several months. About two years ago he had an endoscopic resection of his prostate at a large clinic for the relief of mild prostatism, which had existed for several months. This operation relieved retention but in no way affected the erections. He states that he had gonorrhea in his youth and has been told that he had a stricture. When he came to me he stated that he feared that in some way his trouble might lead to insanity. He exhibits no other neurotic traits. His libido is normal. Physical examination is negative. When first seen he had a mild posterior urethritis, a rather small meatus and a posterior urethral stricture of large caliber. Treatment has consisted of topical applications of silver nitrate through the endoscope, sounds, meatotomy and instillations of silver nitrate to the posterior urethra. Although the urethritis has practically cleared up, there has been no change in his symptoms. He states that he is no longer worried about himself, thanks to my reassurance as to his mental state, but he is otherwise no better. What to do? All available literature deals at length with frank priapism but gives little light on this particular condition. He says he would not at present consent to any measure that would incapacitate him sexually. Please omit name. M.D., Oklahoma.

ANSWER.—Cases similar to the one presented will be found in an article published in the *Medical Journal and Record*, Dec. 3, 1930, page 521, by Max Huhner under the title of "Some Unusual Cases of Priapism." The condition is not serious unless of course due to cerebral or spinal disturbance or to leukemia or some similar condition. It may be that the extramarital liaison, especially if accompanied by ungratified sexual excitement, might have been the starting point of the condition. In the absence of any pathologic condition he should be treated by gentle massage of the prostate and instillations of weak (1:3,000-1:500) silver nitrate solutions into the prostatic urethra. If after two months of this treatment no result is obtained, epidural injections of either plain sterile saline solution or procaine hydrochloride combined with saline solution (procaine 10 cc., saline solution 80 cc.) may be given at intervals of a week, and generally after three such injections relief is obtained. Neither of these procedures interferes with sexual capacity.

### TREATMENT OF ENLARGED PROSTATE AND NONMOTILE SPERM

*To the Editor:*—A man, aged 32, married ten years, without children, whose general health is good, has had a satisfactory sexual life, with normal intercourse and normal discharge. He had gonorrhea when 19, which he says was mild and from which he recovered in a short time. He had an acute attack of "bladder trouble" about a year ago and had to be catheterized for about a week. On rectal examination I find a markedly enlarged prostate, which I would consider 3 plus. The seminal vesicles are very much enlarged and very sensitive. I have been massaging the prostate biweekly for about a month and it is not improving very fast, although he says he has a marked feeling of relief and that he urinates with greater ease and much more freely. The real reason for his coming to me was to see why his wife did not become pregnant. I have made three microscopic examinations of fresh sperm and find no motile sperm in any of them. What I should like to know is what can be done with the prostate as far as the enlargement is concerned and also if there is any chance for his sperm to become normal if the prostate improves. Please answer fully. M.D., Iowa.

ANSWER.—In the description of this case nothing stated is as to the type of material obtained by massage: whether pus is present or not. If the enormous enlargement of the prostate gland as described is due to infection, pus should be obtained at each stripping. Again, the determination of the motility of the sperm depends much on the method used at examination.

If the enlargement is due to infection and this is cleared up by massage, it is possible that active sperm may be found; however, the pathologic nature of the enlargement should be determined in this case by a urologic study.

### PAIN IN COSTOCHONDRAL JUNCTION AFTER A FALL

*To the Editor:*—A white man, aged 40, fell a distance of about 4 feet while carrying two heavy pails of gasoline, about eleven months ago; he landed hard on his heels and immediately fell down, although retaining consciousness. As a direct result of the fall, landing on his heels, and continuing his hold on the pails, he felt a sharp stabbing pain in the region of the sixth or seventh costochondral junction on the right side. He was strapped for several weeks but continued to have this recurrent pain, which appears to shoot upward along the right sternal margin, across to the precordium, and is aggravated by any movement of the right arm which involves abduction. Roentgenograms taken at the time of the injury and repeatedly since reveal no demonstrable injury. Shortly after the accident he "vomited" up several pieces of tissue that looked like liver and has had no more attacks of vomiting. At the present time there is still pain and "clicking" in this region on abduction of the right arm, and any attempt at work (ordinary labor and truck driving) causes rapidly increasing pain in the area and some vertigo. The patient has been told at several clinics that he is suffering from hypoglycemia, bronchitis and nerves. But how can one explain the present disability, the persistent soreness over the sixth costochondral junction, the recurring click in the region? My diagnosis is "chronic subluxation of the right sixth costochondral junction with traumatic neurosis." Kindly omit my name.

M.D., Michigan.

ANSWER.—If this is a compensation case, the patient's progress will be delayed.

If the location of the click can be accurately determined or demonstrated by the stethoscope, exploration is advisable. Rupture of the diaphragm may enter into the discussion. There may be a vertebral injury. Are there any other evidences of neurosis? Roentgenograms made from various angular projections or stereoscopically may be helpful. The arm should be adducted and abducted during successive exposures. The measures of treatment that may be considered are physical therapy, a compression band, a brace, living suture with fascia lata and a fusion operation.

### PAPILLOMA OF BREAST

*To the Editor:*—A woman, aged 28, about 5 feet 8 inches (173 cm.) in height, weight 220 pounds (98 Kg.), began to menstruate at the age of 13; the menses were regular and normal. At 14 she had an appendectomy, at 19 a tonsillectomy and at 21 a double salpingectomy because of pus in the tubes, apparently due to a mixed infection of gonococcus and staphylococcus. About three years ago, when 25 years of age, she had a hysterectomy because of severe dysmenorrhea and menorrhagia. A few months later there started a bloody, serous discharge from the right nipple, which lasted off and on for a few months. No tumor mass was found and the condition cleared up and has not bothered her since until last week. Now it has begun again. No tumor mass is found at the present time. She has a tired feeling in her arms and shoulders and a feeling of numbness of the skin over both breasts and up through to the clavicle. Her breasts are large and pendulous from excessive fat. She carries them well supported, but not much compressed, by a supporting type of brassière. What treatment would you advise? Is there any great probability of this becoming carcinomatous or malignant? Please omit name and address.

M.D., Minnesota.

ANSWER.—The trouble is probably an intercanalicular papilloma of the breast. This is ordinarily a benign growth, commonly so small that it is not palpable. Surgical intervention is preferable to palliation, because there is a rather high incidence of malignancy in such cases.

It is true that there is a close interrelationship between diseases of the ovary and disturbances of the mammary glands. But vicarious menstruation, such as might be thought of in this connection, probably does not occur; at least it is not accepted as a clinical entity by leading gynecologists. Other disturbances of the breasts ascribable to genital stimulation would scarcely be sufficient to produce a bloody discharge from the nipples.

### RAREFYING CONDITIONS OF BONE

*To the Editor:*—An atrophic condition of the bones of the elbow is present. I am concerned chiefly with the possible causes that may be responsible. I am especially interested in what is known as Leriche's disease of bone. The irregularity of the condyle is due to perforation of the osteoporotic areas through the cortex and not to an old fracture. Any further information and references to Leriche's disease of bone will be appreciated. Please omit name.

M.D., New York.

ANSWER.—Leriche's or Sudeck's disease is discussed by King in his book "Rarefying Conditions of Bone," pages 293-307. It may be caused by trauma to nerves or to the vascular system, by disuse or by infection. It also may be reflex ("trophic").

"Leriche has very clearly stated a view which is a modification of the trophic theory. He showed that resorption of bone was often associated with an increased blood supply, and he maintained that bone resorption always occurred as the direct result of augmentation of the blood flow. He also states that diminution of the blood supply results in sclerosis.

"This increase in the blood supply he regards as being the result of a vasomotor reflex—'des reflexes d'axone traumatique.' Although all of Leriche's statements cannot be accepted in their entirety, his contribution is one of the most valuable of recent times."

Further information on this subject may be obtained from Leriche's original articles, which are as follows:

1. Leriche, R.: Sur quelques maladies osseuses et articulaires d'origine vasomotrice et sur leur traitement, *Bull. et mém. Soc. nat. de chir.* **53:** 1022 (July 16) 1927.
2. Leriche, R.: Osteoporose bi-epiphysaire du genou, prise pour une tuberculose: Guérison par injections d'extrait ovarien; Résultat datant de vingt-sept mois, *ibid.* **58:** 434 (March 12) 1932.
3. Leriche, R., and Policard, A.: Les Problems de la physiologie normale et pathologique de l'os, Paris, Masson et Cie, 1926.

### TREATMENT OF SYPHILIS

*To the Editor:*—A man, aged 52, whose weight was about 190 pounds (86 Kg.), complained of severe tinnitus that had existed more than twenty-five years. I found positive Argyll Robertson pupils and the blood Wassermann reaction 4 plus. It is remarkable that nothing of that kind had been found in former examinations by known and experienced physicians. The patient didn't show other signs. The knee jerks were normal. There was no Rosenberg sign. After a course of ten intramuscular injections of iodobismitol twice a week, he felt much improved. May I after a pause of four weeks continue with a combined bismuth-neoarsphenamine course—the latter first in doses of 0.15 Gm? Tryparsamide is contraindicated because an ophthalmologist has stated that especially one eye shows a considerable contraction of the visual field and enlargement of the blind spot. If possible, spinal puncture should be omitted. May I have your suggestions? Please omit name and address.

M.D., New York.

ANSWER.—It would be advisable to continue treatment with bismuth or mercury compounds and iodides. Because of the potential danger of optic atrophy in this case, the arsphenamines should be withheld, at least until several courses of the metals have been given. It may then be used with great care, provided the defects in the visual fields become stationary or improve. A mild treatment over a long period will be found to be more advantageous than a shorter intensive treatment. The possibility of the future use of fever should be kept in mind.

### TREATMENT OF WRIST DROP

*To the Editor:*—Please outline the correct treatment for wrist drop in a middle-aged woman. There is complete loss of the power of extension. The etiology seems quite certainly to be alcoholic neuritis. What is the prognosis? Will the wearing of a splint and removal of alcohol be sufficient to bring about recovery? If published, please omit name and place.

M.D., Connecticut.

ANSWER.—Many patients with drop wrist due to alcoholic neuritis make a satisfactory recovery. The internal use of alcohol should be prohibited. A cock-up splint should be applied along the flexor surface of the forearm, to the ends of the fingers, with the wrist bent backward (extended) at an angle of 35 degrees. This splint should be removed twice daily for massage and muscle training.

In case the paralysis of the extensor muscles should prove to be permanent, a satisfactory functional result can be attained by transplanting the flexor carpi radialis into the extensor tendons of the thumb, and the flexor carpi ulnaris into the extensors of the fingers. Some operators also transplant the pronator radii teres into the extensor carpi radialis longus and brevis.

This form of operative treatment is highly successful in cases in which the musculospiral (radial) nerve has been cut or destroyed but is not often required in cases of alcoholic neuritis.

### TOXICITY OF SNAKE ROOT

*To the Editor:*—I have a patient who from time to time takes Canadian snake root, which he chews for the purpose of eliminating the odor of alcohol on his breath. I am anxious to know whether or not there is any possibility of toxicity arising from this habit. If you have any information, I would appreciate receiving a reference covering this question. Kindly omit name.

M.D., Massachusetts.

ANSWER.—Canada snake root, or wild ginger, is official in the National Formulary as Asarum. It contains aromatic oil and resin, and it is no more toxic than jamaica ginger. A brief description of the drug and its properties is to be found in "Pharmacotherapeutics," by Solomon Solis-Cohen and T. S. Githens, New York and London, D. Appleton & Co., 1928, page 821.

# Medical Examinations and Licensure

## COMING EXAMINATIONS

### STATE AND TERRITORIAL BOARDS

ALABAMA: Montgomery, June 29-July 1. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

ALASKA: Juneau, March 2. Sec., Dr. W. W. Council, Juneau.

ARKANSAS: *Medical (Regular).* Little Rock, May 11-12. Sec., Dr. A. S. Buchanan, Prescott. *Medical (Eclectic).* Little Rock, May 11. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: Los Angeles, Feb. 8-11. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

CONNECTICUT: *Basic Science.* New Haven, Feb. 13. *Prerequisite to license examination.* Address State Board of Healing Arts, 1895 Yale Station, New Haven. *Medical (Homeopathic).* Derby, Feb. 13. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven. *Medical (Regular).* Hartford, March 9-10. *Endorsement.* Hartford, March 23. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden.

DELAWARE: Dover, July 13-15. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, Dover.

FLORIDA: Jacksonville, June 14-15. Sec., Dr. William M. Rowlett, Box 786, Tampa.

IDAHO: Boise, April 6. Commissioner of Law Enforcement, Hon. J. L. Balderston, 205 State House, Boise.

ILLINOIS: Chicago, Jan., 26-28. Superintendent of Registration, Department of Registration and Education, Mr. Homer J. Byrd, Springfield.

INDIANA: Indianapolis, June 22-24. Sec., Board of Medical Registration and Examination, Dr. William R. Davidson, 301 State House, Indianapolis.

KENTUCKY: Louisville, June 9-11. Sec., State Board of Health, Dr. A. T. McCormack, 532 W. Main St., Louisville.

MAINE: Portland, March 9-10. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Medical (Regular).* Baltimore, June 15-18. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Medical (Homeopathic).* Baltimore, June 8-9. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MICHIGAN: Ann Arbor and Detroit, June 9-11. Sec., Board of Registration in Medicine, Dr. J. Earl McIntyre, 202-3-4 Hollister Bldg., Lansing.

MONTANA: Helena, April 6. Sec., Dr. S. A. Cooney, 7 W. 6th Ave., Helena.

NEVADA: *Reciprocity.* Carson City, Feb. 1. Sec., Dr. John E. Worden, Carson City.

NEW HAMPSHIRE: Concord, March 11-12. Address, Board of Registration in Medicine, State House, Concord.

NEW JERSEY: Trenton, June 15-16. Sec., Dr. James J. McGuire, 28 W. State St., Trenton.

NEW MEXICO: Santa Fe, April 12-13. Sec., Dr. Le Grand Ward Box 693, Santa Fe.

NEW YORK: Albany, Buffalo, New York and Syracuse, Jan. 25-28. Chief, Professional Examinations Bureau, Mr. Herbert J. Hamilton, 315 Education Bldg., Albany.

NORTH CAROLINA: Raleigh, June 21. Sec., Dr. Ben J. Lawrence, 503 Professional Bldg., Raleigh.

OKLAHOMA: Oklahoma City, June 9-10. Sec., Dr. James D. Osborn Jr., Frederick.

OREGON: *Basic Science.* Portland, March 20. Sec., Mr. Charles D. Byrne, University of Oregon, Eugene.

PUERTO RICO: San Juan, March 2. Sec., Dr. O. Costa Mandry, Box 536, San Juan.

VERMONT: Burlington, Feb. 10-12. Sec., Board of Medical Registration, Dr. W. Scott Nay, Underhill.

VIRGINIA: Richmond, June 17-19. Sec., Dr. J. W. Preston, 28½ Franklin Road, Roanoke.

WEST VIRGINIA: Charleston, March 1. Sec., Public Health Council, Dr. Arthur E. McClue, State Capitol, Charleston.

WISCONSIN: *Basic Science.* Madison, April 3. Sec., Prof. Robert N. Bauer, 3414 W. Wisconsin Ave., Milwaukee.

WYOMING: Cheyenne, Feb. 1. Sec., Dr. G. M. Anderson, Capitol Bldg., Cheyenne.

### NATIONAL BOARD OF MEDICAL EXAMINERS SPECIAL BOARDS

Examinations of the *National Board of Medical Examiners* and *Special Boards* were published in THE JOURNAL, January 16, page 230.

## Ohio June Report

Dr. H. M. Platter, secretary, Ohio State Medical Board, reports the oral, written and practical examination held in Columbus, June 16-19, 1936. The examination covered 10 subjects and included 80 questions. An average of 75 per cent was required to pass. Two hundred and eighty-three candidates were examined, 281 of whom passed and 2 failed. Fifty-eight physicians were licensed by reciprocity and 4 physicians were licensed by endorsement. The following schools were represented:

| School | PASSED | Year Grad. | Per Cent. |
|---|---|---|---|
| Georgetown University School of Medicine | | (1935) | 78.9 |
| Hahnemann Medical College and Hospital, Chicago | | (1899) | 75 |
| Loyola University School of Medicine | | (1936) | 80.5,* 83.4,* 84.5* |
| Northwestern University Medical School | | (1936) | 81.6, 83.6, 85.4 |
| Rush Medical College | | (1935) | 81.8, 84.3, (1936) 75, 78.9† |
| Boston University School of Medicine | | (1936) | 85.3 |
| Harvard University Medical School | | (1935) | 82.4, (1936) 83.6 |
| University of Minnesota Medical School | | (1930) | 83.5 |
| St. Louis University School of Medicine | | (1935) | 84 |
| Washington University School of Medicine | | (1936) | 86.1 |
| Creighton University School of Medicine | | (1936) | 79.9 |
| University of Nebraska College of Medicine | | (1929) 75, (1933) | 88.3 |
| Cornell University Medical College | | (1935) | 82.4 |
| University of Buffalo School of Medicine | | (1935) 83, (1936) | 83.5 |
| University of Rochester School of Medicine | | (1935) | 82 |
| Eclectic Medical College, Cincinnati | | (1936) | 76.9, 78.2, 79.1, 79.2, 79.7, 79.7, 79.8, 80.2, 80.4, 80.5, 80.5, 80.9, 81.3, 81.3, 81.3, 82, 82.4, 82.4, 82.4, 82.7, 82.7, 83.3, 83.7, 84, 84.2, 84.3, 85.3, 85.5, 85.7, 88, 88.8 |
| Ohio State University College of Medicine | | (1936) 75, | 75.1, 77.6, 77.7, 77.8, 77.9, 78, 78.5, 78.8, 78.9, 79.1, 79.2, 79.2, 80.1, 80.1, 80.2, 80.6, 80.6, 80.7, 80.8, 81, 81.2, 81.2, 81.2, 81.3, 81.4, 81.5, 81.5, 81.5, 81.5, 81.5, 81.7, 81.9, 82, 82.2, 82.2, 82.2, 82.2, 82.3, 82.4, 82.4, 82.5, 82.5, 82.5, 82.6, 82.7, 82.7, 82.7, 82.8, 82.8, 82.9, 83, 83, 83.1, 83.2, 83.2, 83.3, 83.6, 83.6, 83.6, 83.7, 83.7, 83.8, 83.9, 83.9, 84, 84.1, 84.1, 84.1, 84.2, 84.2, 84.3, 84.5, 84.7, 84.7, 84.8, 85.3, 85.6, 85.7, 85.7, 85.9, 86.2, 86.4, 86.6, 87.5, 88.1, 88.2, 88.7 |
| University of Cincinnati College of Medicine | | (1936)‡ | 76.2, 76.8, 77.1, 77.3, 77.7, 78.2, 78.5, 78.7, 78.7, 78.8, 79.1, 79.2, 79.4, 79.6, 79.7, 79.8, 80.2, 80.2, 80.7, 80.8, 80.9, 81.3, 81.7, 81.7, 81.8, 82, 82, 82.2, 82.4, 82.6, 82.6, 82.6, 82.8, 82.8, 82.9, 82.9, 83.1, 83.3, 83.3, 83.5, 83.6, 83.7, 84, 84.1, 84.1, 84.2, 84.2, 84.3, 84.4, 84.5, 84.6, 85.1, 85.3, 85.4, 85.4, 85.6, 85.6, 85.8, 86, 86.4, 86.4, 86.6, 86.8, 87.2 |
| Western Reserve University School of Medicine | | (1936) | 76.1, 78.6, 79.1, 79.3, 80, 80.3, 80.4, 80.5, 80.6, 80.9, 80.9, 81.4, 81.6, 81.7, 81.9, 82, 82, 82.2, 82.3, 82.4, 82.4, 82.4, 82.4, 82.5, 82.6, 82.7, 82.7, 82.8, 82.8, 83, 83.1, 83.4, 83.4, 83.5, 83.6, 83.6, 83.8, 83.8, 84.1, 84.4, 84.5, 84.6, 84.7, 84.8, 84.9, 85, 85.1, 85.5, 85.7, 85.7, 85.8, 85.8, 85.9, 86.1, 86.7 |
| Jefferson Medical College of Philadelphia | | (1935) | 86.2, (1936) 84.2 |
| University of Pennsylvania School of Medicine | | (1935) | 81.2, (1936) 83.4, 87.8 |
| University of Pittsburgh School of Medicine | | (1936) | 81.9, 82.9 |
| Marquette University School of Medicine | | (1936) | 76.7,* 79.3 |
| University of Wisconsin Medical School | | (1935) | 83.8 |
| Dalhousie University Faculty of Medicine | | (1933) | 86.5 |
| Queen's University Faculty of Medicine | | (1930) | 85.4 |
| Albert-Ludwigs-Universität Medizinische Fakultät, Freiburg | | (1914) | 76.2§ |
| Friedrich-Wilhelms-Universität Medizinische Fakultät, Berlin | | (1934) | 80§ |
| Universität Köln Medizinische Fakultät | | (1934) | 81.1§ |
| Universität Leipzig Medizinische Fakultät | | (1922) | 80§ |
| University of Edinburgh Faculty of Medicine | | (1935) | 80.6 |
| Universität Basel Medizinische Fakultät | | (1935) | 79.4§ |

| School | FAILED | Year Grad. | Per Cent. |
|---|---|---|---|
| Medizinische Fakultät der Universität Wien | | (1932) | 66.1§ |
| Albertus-Universität Medizinische Fakultät, Königsberg | | (1920) | 70§ |

| School | LICENSED BY RECIPROCITY | Year Grad. | Reciprocity with |
|---|---|---|---|
| University of Arkansas School of Medicine | | (1934) | Arkansas |
| Emory University School of Medicine | | (1935) | Georgia |
| University of Georgia School of Medicine | | (1935) | Georgia |
| Howard University College of Medicine | | (1935) | Maryland, N. Carolina |
| Northwestern University Medical School | | (1933) | Illinois |
| University of Illinois College of Medicine | | (1918), (1933) | Illinois |
| Indiana University School of Medicine | | (1932), (1934) | Indiana |
| State University of Iowa College of Medicine | | (1935) | Iowa |
| University of Louisville School of Medicine | | (1927), (1935, 2) | Kentucky |
| Tulane University of Louisiana School of Med. | | (1927), (1935) | Louisiana |
| Johns Hopkins University School of Medicine | | (1931), 1932) | Maryland |
| University of Michigan Department of Medicine and Surgery | | (1913) | Michigan |
| University of Michigan Medical School | | (1922), (1931, 2), (1934), (1935, 2) | Michigan |
| Wayne University College of Medicine | | (1936, 3) | Michigan |
| University of Minnesota Medical School | | (1929) | Michigan |
| St. Louis University School of Medicine | | (1929), (1933, 2), (1934), (1935, 10) | Missouri |
| Washington University School of Medicine | | (1931), (1932), (1933), (1935) | Missouri |
| University of Buffalo School of Medicine | | (1931) Pa., (1933) | New York |
| Meharry Medical College | | (1917), (1933) | Tennessee |
| Vanderbilt University School of Medicine | | (1932) | Tennessee, (1934) Mississippi |
| University of Vermont College of Medicine | | (1935) | Vermont |
| University of Virginia Department of Medicine | | (1930, 2) | Virginia |
| University of Toronto Faculty of Medicine | | (1931) | Louisiana |
| Friedrich-Wilhelms-Universität Medizinische Fakultät, Berlin | | (1932) | Maryland |

| School | LICENSED BY ENDORSEMENT | Year Grad. | Endorsement of |
|---|---|---|---|
| Harvard University Medical School | | (1930), (1933) | N. B. M. Ex. |
| Western Reserve University School of Medicine | | (1930) | N. B. M. Ex. |
| University of Oklahoma School of Medicine | | (1935) | N. B. M. Ex. |

* This applicant has completed the medical course and will receive the M.D. degree on completion of internship. License has not been issued.

† License has not been issued.

‡ These applicants have received the M.B. degree and will receive the M.D. degree on completion of internship.

§ Verification of graduation in process.

# Book Notices

**Diseases of the Air and Food Passages of Foreign-Body Origin.** By Chevalier Jackson, M.D., Sc.D., F.A.C.S., Professor of Bronchoscopy and Esophagoscopy, Temple University, and Chevalier L. Jackson, A.B., M.D., M.Sc., Professor of Clinical Bronchoscopy and Esophagoscopy, Temple University. Cloth. Price, $12.50. Pp. 994, with 2,000 illustrations. Philadelphia & London: W. B. Saunders Company, 1936.

The Jacksons have added another stone to the monumental edifice they have erected in a long and brilliant career begun by the elder and collaborated in by the younger. It is a volume that should be read by every internist, pediatrician and laryngologist because it deals with problems of vital interest to all. That the spreading of this knowledge, the result of pioneering in a previously obscure field and the fruit of painstaking investigation with an enormous mass of material, is sorely needed can be justified by the startling statement of the authors that they had treated more than 400 cases of foreign bodies in the air and food passages in which the diagnosis had been overlooked prior to admission to their care. After reading this book physicians must of necessity become propagandists in the cause of prevention, since the authors in discussing etiology have shown that 87 per cent of foreign bodies gain access to the food and air tracts through carelessness. This applies particularly to the aspiration or swallowing of various objects by young children, who instinctively put everything into their mouths that their hands can grasp. This is certainly a field for the education of parents. On the subject of diagnosis the authors stress the tremendous value of proper x-ray examination in all doubtful cases of pulmonary or esophageal disease in which there is even the remotest possibility of a foreign body being present despite a negative history. Every type of foreign body that has ever been aspirated or swallowed is described with reference not only to the mode of entrance but also to the mechanism of its lodgment and the reasons for the presence or absence of symptoms as well as the pathologic changes induced. Objects of the same type in the same location produce different symptoms according to the length of their sojourn, and such cases are reviewed side by side with such clarity that the parallel once seen and studied yields a lesson that can never be forgotten. Beautiful color drawings executed by the elder Jackson illustrate these points beyond all words of description.

The problems attendant on the removal of foreign bodies are thoroughly discussed from every angle and the authors furnish the most minute details pertaining to each type and location of foreign body. Even the experienced bronchoscopist as well as the occasional operator will find this section of the book a welcome refuge in time of trouble.

Finally, the listing of 3,000 cases arranged in groups according to the nature of the foreign body with reproductions of photographs of the latter and the practical details associated with each case constitutes more than half of the volume and is a veritable storehouse of concrete knowledge which should instruct and guide the laryngologist through many a difficult situation.

**An Introduction to Psychological Medicine.** By R. G. Gordon, M.D., D.Sc., F.R.C.P., Physician to Royal United Hospital, Bath, N. G. Harris, M.D., B.S., D.P.M., Physician in Charge to Woodside Hospital, London, and J. R. Rees, M.A., M.D., D.P.H., Medical Director, Institute of Medical Psychology, London. Cloth. Price, $4. Pp. 386. New York & London: Oxford University Press, 1936.

The term psychological medicine is used in England by several examining bodies who grant a diploma in psychological medicine (D.P.M.). This diploma is taken by medical graduates specializing in psychiatry and is elsewhere named Diploma in Psychiatry. This is therefore a textbook in psychiatry and is intended for the use of medical students. The five sections comprise psychology in relation to psychologic medicine, psychopathology, psychoneuroses, psychoses, and mental deficiency. The presentation is on conventional lines and is both clear and simple. The sections on treatment have been written in a practical way. The authors take the view that the treatment of mental illness is a subject for postgraduate study and hence they do not attempt to give details of psychotherapeutic treatment. This point of view is open to question and is somewhat surprising when one considers the emphasis being placed by modern educators on the importance of psychiatry in the field of general medicine. With such considerations in mind, one might also have hoped that the section on psychoneuroses would have been lengthened at the expense of that on the psychoses. However, the book is in keeping with the modest number of lectures the authors suggest the students should have; that is, four or five lectures in psychology, three or four lectures in psychopathology, five lectures on the psychoneuroses, eight lectures on the psychoses, and two on mental deficiency. One must note that the two chapters covering the laws relating to mental disorders and to the legal, educational and social implications of mental deficiency apply to practices and facilities as they exist in England. As an elementary book for the medical student, the volume has many merits and can be recommended.

**The Clinical Use of Digitalis.** By Drew Luten, A.B., M.D., Associate Professor of Clinical Medicine in the Washington University School of Medicine, Saint Louis. Cloth. Price, $3.50. Pp. 226. Springfield, Illinois, & Baltimore: Charles C. Thomas, 1936.

President Andrew Jackson once wrote that he had sworn to uphold the constitution "as he understood it, and not as it was understood by others." Similarly, in this book Dr. Luten has presented the case for the clinical use of digitalis as he sees it. This statement must not be looked on as adverse criticism. The case is well presented; but when any one deals with so controversial a subject as this, any presentation will receive criticism in some quarters and the subject will remain controversial until the experimentalist and the clinician find some way to meet on common ground.

The book first considers the pharmacologic effect of digitalis on the heart muscle, the auriculoventricular tissues and the pacemaker. The diuretic effect, or, rather, the lack of it, blood vessel and blood pressure phenomena, and alterations in the electrocardiogram are briefly discussed. Toxic manifestations are listed. The remainder of the book, well over half of it, deals with the indications for the use of digitalis, its use in special situations, and its dosage and method of administration. Dr. Luten states that the one essential indication for the use of digitalis is congestive heart failure. In any other instance its efficacy may be questioned but never in this one. He believes that the beneficent action comes about almost wholly because of the effect on the ventricular muscle. Even in auricular fibrillation this effect plays a more important part than does the effect on the conducting tissues. He predicates this statement largely on his observation that it is almost impossible to slow the ventricular rate in auricular fibrillation when congestive failure is not present. This statement will not go unchallenged. In view of his insistence on the direct muscle action as the agent which produces the favorable result, it seems inconsistent to point out that a better result is to be expected from the use of the drug in one type of heart failure when compared with another type. He states that the response in coronary hypertensive disease failure is better than that in rheumatic disease failure. If this statement is true and his original thesis is correct, such a response would indicate only a greater destruction of muscle in rheumatic disease. The drug still affects the heart muscle and not the disease that produces the heart muscle damage.

Dr. Luten states that all evidence points to the fact that digitalis brings about an unchanged or a diminished volume output except in cases of heart failure. This observation does not fit in with his willingness to use digitalis in instances in which no failure is present but its onset may be suspected. In no place does he mention the irritant action of digitalis except as a toxic phenomenon. It has been suggested that digitalis should be used with caution in those instances in which the heart muscle is inclined toward excessive irritability. Dr. Luten apparently does not subscribe to this view. All these differences of opinion are at once forgotten when the chapters on dosage and administration are read. If one decides to give digitalis, one needs only to read the advice given here and the treatment will be correctly carried out. The book may be read with profit by all students and practitioners and will be especially valuable to those who have not had the opportunity to follow the recent voluminous literature dealing with the subject.

**Handbuch der biologischen Arbeitsmethoden.** Herausgegeben von Geh. Med.-Rat Prof. Dr. Emil Abderhalden, Direktor des Physiologischen Institutes der Universität Halle a. d. Saale. Abt. V, Methoden zum Studium der Funktionen der einzelnen Organe des tierischen Organismus, Teil 3B, Heft 6. Lieferung 454. Auxine. Von A. N. J. Heyn. Darstellung des Melanophorenhormons. Von F. Dietel. Darstellung und Wirkungsprüfung des Fettstoffwechselhormons und des Kohlehydratstoffwechselhormons des Hypophysenvorderlappens. Von Karl Julius Anselmino und Friedrich Hoffmann. Hypophysektomie. Von A. Geesink. Darstellung und Eigenschaften des kristallisierten Insulins. Von Oskar Wintersteiner und Hans Jensen. Untersuchungen der hormonalen Funktion der Thymus. Von Leon Asher. Paper. Price, 6 marks. Pp. 823-936, with illustrations. Berlin & Vienna: Urban & Schwarzenberg, 1936.

This volume contains reviews on the isolation and properties of the plant and animal hormones. The comprehensive treatment of the growth hormone "Auxine" by A. N. J. Heyn gives a discussion of the various practical preparations of the hormone and gives an excellent proof of its chemical structure. Biologic tests are described in detail and are accompanied by helpful illustrations of apparatus used in assaying the preparations.

The literature regarding the preparation of the melanophore hormone from the posterior lobe of the pituitary gland is briefly reviewed by F. Dietel. The research on this interesting substance is still in its early stages. Unfortunately, the author has not endeavored to bring the bibliography down to date.

K. J. Anselmino and F. Hoffmann describe the preparation and tests for the ketogenic and blood sugar raising hormone of the anterior lobe of the pituitary gland. It is a short treatise but covers the literature to date.

A. Geesink describes the technic of hypophysectomy. The clear, concise exposition should enable any biologic worker to follow his method. The necessary instruments and their uses are mentioned, and detailed illustrations of the various phases of the operation are given. The paper includes a valuable bibliography of the surgical anatomy of the pituitary gland.

O. Wintersteiner and H. Jensen review the preparation and properties of crystalline insulin. In view of the fact that the practical preparation of insulin is mostly a commercial trade secret, the authors describe only the classic works of Abel and of Harington and Scott. The physical and chemical properties of insulin are briefly mentioned. It is regretted that the bibliography is reviewed only to 1933, making this otherwise valuable presentation somewhat obsolete.

A short review of the hormonic function of the thymus is contributed by Leon Asher. Nutrition of the animals, extirpation of the thymus, preparation, and tests for identification of the active principle, which he calls "thymocrescin," are briefly discussed. Comparisons with extracts of other organs are given. References to the original literature are scanty.

It would be desirable for the publisher in the future to ask the authors to complete the bibliographies in a short supplement, should the presentations have been written long before the printing was finished.

**The Practice of Medicine.** By Jonathan Campbell Meakins, M.D., LL.D., Professor of Medicine and Director of the Department of Medicine, McGill University, Montreal. Cloth. Price, $10. Pp. 1,343, with 505 illustrations. St. Louis: C. V. Mosby Company, 1936.

Perhaps a dozen different textbooks of the practice of medicine now appeal for the favor of students and practitioners. Dr. Meakins does not attempt here a treatise for specialists or an encyclopedia but rather a book of usefulness to students and practitioners as a reference. Unlike many other authors of textbooks of the practice of medicine he has relied largely on illustration to aid in advancement of knowledge and the book is supplemented by more than 500 halftones and other illustrations, including many plates in colors. He has been aided in his development of the book by his colleagues on the faculty of McGill University.

In his approach to the subject he begins with the diseases of the nose and throat and then takes up system by system, concluding with the infections, allergy, environment and drugs. Each of the chapters in the book is supplemented by a brief bibliography and the author refers frequently in the course of his writing to his source of information. There is little or no ornamentation of style and the volume is but slightly personal in its approach to any of the subjects that are discussed. It seems rather to be a straightforward, concentrated statement of the available established knowledge, planned to give fundamental facts to the user as quickly as possible. An occasional footnote in small type is found devoted to a personal reference by the author to individual cases that he has seen. The striking feature of this textbook is unquestionably the illustrative material.

**Entomological Studies: Studies on Insects of Medical Importance in South Africa—Part III.** By Botha De Meillon, D.Sc., F.R.E.S. From the Malaria Research Station of the South African Institute for Medical Research, at Eshowe, Zululand. Publications of the South African Institute for Medical Research—No. XXXVIII. (Vol. VII). Paper. Pp. 125-215, with 32 illustrations. Johannesburg: The Institute, 1936.

The first three parts consist of short articles on Anopheles mosquitoes. Studies on the egg, larval, pupal and imaginal stages of Anopheles listeri place it in the turkhudi group. Eggs of A. coustani and A. coustani var. tenebrosus are figured and described. Actual distribution of A. gambiae and A. funestus in Natal does not coincide with the distribution that would be determined by climatic factors. Breeding of A. gambiae is restricted by dense growths of vegetation, usually cane. It is thought, therefore, that the droughts of 1928, 1930 and 1931 paved the way for the serious epidemic of malaria in 1931-1932 by reducing the amount of such vegetation. Physical features such as mountains do not favor the breeding of A. funestus, for in such localities the streams are being continually flushed. Part 4 is a list of South African Ceratopogonidae previously reported, and part 5 deals with new and unrecorded species of these insects. Twenty-four new species belonging to twelve genera are described and illustrated, and there is one new record of a previously described species. In part 6 three new species of Simulium are described.

**A Laboratory Manual of Qualitative Chemical Analysis for Students of Pharmacy.** By Theodore J. Bradley, Phm.D., A.M., B.S., Dean and Professor of Chemistry in the Massachusetts College of Pharmacy. Fifth edition. Cloth. Price, $2.25. Pp. 170. Philadelphia: Lea & Febiger, 1936.

The purpose of this manual is to acquaint the student with general laboratory methods of qualitative analysis and to aid him to make such tests for identity and purity as come within the purview of a pharmacist. The course, for which the book is a guide, is arranged to occupy from four to five hours a week during one school year. The metals are classified in the customary seven groups for identification. No new methods are described in the procedure. Each group is treated as a separate chapter, at the end of which is a cumulative chart for the identification of all the elements in the preceding groups. The acids are divided into three groups for identification: (*a*) acids precipitated by silver nitrate, (*b*) acids precipitated by barium chloride and (*c*) acids not precipitated by either of the foregoing methods. Directions are also given for the analysis of metals and acids in the same solution. For each metal and acid identified in the procedures are given its important compounds. Short chapters are included on topics such as the qualitative analysis of a solid, qualitative examination of official inorganic chemicals, destruction of organic matter, qualitative tests of the United States Pharmacopeia, and reagents and test solutions. As a laboratory guide the manual covers the essentials of inorganic qualitative analysis for those who wish a fairly superficial course but is in no sense a reference book. Conspicuously absent is the consideration of the theoretical aspects of qualitative analysis. Throughout the book the author refers to the anions and cations as acids and metals.

**A Text Book of Pharmacognosy.** By Heber W. Youngken, A.M., Phm.M., Ph.D., Professor of Pharmacognosy and Materia Medica in the Massachusetts College of Pharmacy, Boston. Fourth edition. Cloth. Price, $7. Pp. 924, with 469 illustrations. Philadelphia: P. Blakiston's Son & Co., Inc., 1936.

This textbook, primarily intended for students of pharmacy, has undergone a thorough revision and contains much new material and illustrations. The book is divided into two parts. Part I deals with morphologic considerations of drugs and includes the sections dealing with fundamental considerations, such as collection, curing, valuation, sampling and preservation. Part II contains a taxonomic consideration of drugs and additional information concerning their description, histology and constituents. The chapter on animal drugs has been expanded to include new monographs on endocrine gland

products and bacterial biologic products. The author has recognized the various changes that have taken place in pharmacognosy as well as those which have been incorporated in the latest editions of the United States Pharmacopeia and the National Formulary. The volume is of value to drug analysts and collectors of crude drugs and is an excellent work of reference for the physician who may desire information concerning the characteristics and constituents of crude drugs.

**Medicine and Mankind. Lectures to the Laity Delivered at the New York Academy of Medicine.** Edited by Iago Galdston, M.D. Introduction by Eugene H. Pool, M.D., President, New York Academy of Medicine. Cloth. Price, $2. Pp. 217, with 6 illustrations. New York & London: D. Appleton-Century Company, Incorporated, 1936.

A listener has frequently come away from a meeting enthusiastic about the principal speaker. In his enthusiasm he has expressed a wish that if he could but have a copy of the lecture he has just heard it would serve as an inspiration as well as excellent reading during leisure moments. In this book the listener's wish has been granted. A series of lectures that have been given at the New York Academy of Medicine has been brought together. The names of the various speaker-authors are well known and command respect. Their abilities are recognized and well established and require no comment. The reviewer was left with a feeling, on completing the book, that there was something lacking, something gone from each lecture so that the reader, unlike the listener, had no exceptionally great desire for a copy of the "speech" nor had he any particular wish to hear the speech itself. The "something lacking" is the author. It is the author, or rather speaker, that puts across a talk. When that talk is transferred to the page it all too often produces little inspiration and falls into the class of just another bit of history.

**Oxidation-Reduction Potentials in Bacteriology and Biochemistry.** By L. F. Hewitt, Ph.D., B.Sc., F.I.C., Biochemist at the Belmont Laboratories, Sutton, Surrey. With a foreword by the Medical Officer of Health. London County Council, No. 3200. Fourth edition. Paper. Price, 2s. Pp. 101, with 27 illustrations. London: P. S. King & Son, Limited, 1936.

The theoretical considerations of oxidation-reduction potentials are identical with those given in previous editions. Apparatus and methods described are essentially the same as in former editions. A thermionic valve electrometer circuit for the measurement of biologic potentials is described briefly. The charts of dye indicators for potential measurements are increased in size and are evaluated to $p_H$ 7. Studies on tumors, tissue cultures and yeast preparations have been added to the section on systems of special biologic interest. The section on bacteriologic applications has been brought down to date. Note is made of vitamin-like growth accessory substances and oxidation-reduction potentials in the making of cheddar cheese. New data are given on the potentials produced by members of the Salmonella and nonsporulating anaerobe groups. The monograph furnishes an excellent source of references for more detailed reading.

**How We Came by Our Bodies.** By Charles B. Davenport. Cloth. Price, $3.75. Pp. 401, with 236 illustrations. New York: Henry Holt & Co., 1936.

The title is intriguing and would make the average reader-parent pick up the book. But he would put it down soon as being a little too difficult, a little too technical for his "average intelligence." As a textbook for college students it can be recommended. Even the average reader-parent will need a guide or instructor to help him. The author presents his subject in three parts. The first is the development of the single cell into the adult human being. The second part discusses in detail the structure of the cell, how the cells become differentiated, and the part played by heredity, genes, tramp cells and their migration. A chapter entitled "Meeting Stresses and Accidents" discusses twins, as well as making embryos develop abnormally. The third part deals with the origin of the various parts of the machinery of development. It deals with the genes and the mechanism by which they have been handed to us. Then the author discusses bacteriophages, mutations, cephalic index and albinism, as well as mutations in metabolism and hair length, blood groups and eye color. The physician today is concerning himself with sex education to a greater degree than formerly. He is constantly seeking aids for this purpose. This book is not one that he can take from his shelf and hand to a harassed parent who is seeking an answer to the question Just how do you have a baby? Cross sections of the haversian system of a macerated human hip bone won't help him any more than tangential section of ramie fibers showing dextrose units.

**At the Point of a Lancet: One Hundred Years of the Canton Hospital, 1835-1935.** By William Warder Cadbury, A.M., M.D., F.A.C.P., Superintendent of the Canton Hospital, and Mary Hoxie Jones, B.A. Cloth. Price, $2; 10s. Pp. 304, with 13 illustrations. Shanghai: Kelly & Walsh, Limited, 1935.

The figurative title of this work does not indicate its actual purport. The subtitle is, however, a statement of the real nature of the book. The volume is a record of one hundred years of the work of the Canton Hospital, an institution which has had a notable career in China, contributing not only to the actual care of the sick but also to the advancement of medical science. Among the graduates of the school at Canton was Dr. Sun Yat-sen, famous statesman of China, who died of cancer on March 12, 1935. Particularly interesting are the biographies of some of the famous persons associated with the school and the hospital. Dr. Cadbury in his concluding chapter indicates his belief that there will always be a future for the foreign doctor in China, particularly as the expert who opens up fields in a way in which only the missionary doctor can function.

**Diseases of the Eye.** By Sir John Herbert Parsons, C.B.E., D.Sc., F.R.C.S., Consulting Ophthalmic Surgeon, University College Hospital, London. Eighth edition. Cloth. Price, $5.50. Pp. 705, with 381 illustrations. New York: Macmillan Company, 1936.

The first edition of this justly popular textbook of ophthalmology was published in 1907 and public demand has forced the author to this, the eighth, edition, not including reprinting of the fourth and sixth editions. The difference between this and the previous edition can be best given in the words of the author which form the preface:

> Though no very radical changes have been made in this edition and the same care has been taken to retain the relative importance of details so that the student and medical practitioner may view them in their proper perspective, it has been thought advisable to refer briefly to some modern advancements in treatment, such as the detached retina. Further, although the time is not yet ripe for estimating the future practical value of physiological and biochemical researches, some of them have been of such outstanding significance that it was deemed wise to draw attention to them. Among these one may mention the rôle of chemical substances, e. g., histamine and acetylcholine, in nerve stimulation, axon reflexes, vitamins, and viruses. Very encouraging advance has been made in our knowledge of the biochemistry of the lens, though it would be premature to assess its value for the etiology of cataract.

For the medical student and for the general practitioner, this book is of inestimable value, which is enhanced by the excellent illustrations. It is written by a master of ophthalmology and is based on his long practical experience.

**Psychiatrische Vorlesungen für Ärzte.** Von Prof. Dr. Kurt Schneider, Direktor des Klinischen Instituts der Deutschen Forschungsanstalt für Psychiatrie (Kaiser Wilhelm-Institut) in München. Second edition. Boards. Price, 6.20 marks. Pp. 196. Leipzig: Georg Thieme, 1936.

This compend discusses schizophrenia, cyclothymic psychosis, psychopathic personality, neurasthenia, hysteria, abnormal life reactions, mental abnormalities of children and young adults, suicide, psychosis due to internal diseases, brain diseases and epilepsy, psychiatric symptomatology and diagnosis, and psychiatric management. In an appendix Schneider discusses psychiatric system and structure of the psychosis as well as the diagnosis of schizophrenia and manic depressive insanity. The style is difficult because of the long and rather difficult structure of its sentences. There is an abundance of superfluous discussion. The bibliography is small.

**Das Ärztebüchlein: Eine Sammlung besinnlicher Worte für die Feierstunde des Arztes, zugleich ein Ratgeber für die tägliche Praxis. Unter Mitbenutzung hinterlassener Aufzeichnungen Erwin Liek's.** Von Walther Klussmann. Mit einem Geleitwort von Prof. Dr. Klare. Cloth. Price, 4.80 marks. Pp. 199. Leipzig: Georg Thieme, 1937.

In this volume the author has collected quotations from a great mass of literature, largely German but also classical, dealing with the physician. It is classified according to the philosophical contributions, the art of medicine, the fee and similar topics.

**A Dissertation on the Sensible and Irritable Parts of Animals.** By Albrecht von Haller. [London, J. Nourse, 1755]. Introduction by Owsei Temkin. Boards. Price, $1. Pp. 49, with one illustration. Baltimore: Johns Hopkins Press, 1936.

Following a brief introduction to the topic by Owsei Temkin in which is told a little of the life of the famous von Haller, this book provides a reprint of one of von Haller's most famous essays. It indicates how great a part he played in the development of experimental physiology.

## *Bureau of Legal Medicine and Legislation*

### MEDICOLEGAL ABSTRACTS

**Malpractice: Roentgen Burn.**—The defendant, a physician, utilized roentgen therapy in treating the plaintiff for a condition of the skin described as "eczema or some kindred ailment." Alleging that by reason of the defendant's negligence she sustained burns on her scalp, face, arm and breast, the plaintiff brought suit. The trial court gave judgment for the plaintiff, which the court of civil appeals, Texas, affirmed after requiring a remittitur (62 S. W. (2d) 600; abstr. THE JOURNAL, March 24, 1934, p. 960). The defendant then appealed to the Supreme Court of Texas.

It was undisputed, said the Supreme Court, that, at the time the plaintiff called on the defendant for medical treatment, she was suffering from eczema or some kindred ailment. The plaintiff's evidence tended to show that as the result of the roentgen treatment she sustained roentgen burns, that she had lost her hair, which at the time of the trial had been partially restored, that the skin on her face, arms and breast had "peeled off," leaving the surface sensitive and irritable, and that she had suffered physical and mental pain as a consequence of her injuries. The defendant, on the other hand, offered evidence tending to show that the plaintiff's condition at the time of the trial was due to "eczema or some disease of that type." On appeal, the defendant contended that the trial court had erred in refusing to present the following special issues to the jury:

> Is Mrs. Rachel La Grone's condition the result of a disease known as eczema?
>
> Is Mrs. Rachel La Grone's condition the result of some disease other than the application of the x-ray?

It is obvious, said the Supreme Court, that these requested charges were not correct, and, if answered in the affirmative, would not have constituted a complete defense to the plaintiff's case. Even if the plaintiff's condition at the time of the trial was due to eczema, nevertheless she could have suffered various injuries as a result of the burns, as claimed by her, and her condition could have been materially different at the time of the trial from what it was, as shown by her testimony, immediately after the treatment. The question really resolved itself into an inquiry as to what extent, if any, the eczema contributed to the injuries suffered by the plaintiff, and this question was not raised in the special issues which the defendant requested be given to the jury. The Supreme Court could find no reversible error in the record and affirmed the judgment of the court of civil appeals.—*Kenney v. La Grone (Texas), 93 S. W. (2d) 397.*

**Malpractice: Criteria of Standard of Skill and Care Required of Physicians.**—The Columbia Health Foundation sold "health and medical services and hospitalization" for a stipulated sum per month. The Angelus Hospital Association, also referred to in the record as R. B. Jenkins, Inc., operated a hospital wherein it "took care of the customers" of the Health Foundation for a stipulated sum. Dr. R. B. Jenkins was the president of the corporation hospital, the principal owner of its stock, and its general surgeon. The plaintiff was apparently a "customer" of the Health Foundation and his wife was admitted to the hospital for her confinement. The baby developed impetigo and subsequently died, whereupon the plaintiff sued the Health Foundation, the hospital corporation, and certain physicians employed by the hospital, alleging negligence in permitting the baby to contract impetigo, in treating it thereafter, and in discharging the plaintiff's wife and her baby at a time when the baby was still suffering from "an acute attack of impetigo." The plaintiff obtained judgment against all the defendants, who, with the exception of those connected with the Health Foundation, appealed to the district court of appeal, second district, division 1, California.

The principal issue raised on appeal had relation to the form in which a certain hypothetical question was put to an expert witness for the plaintiff. The vice attributed to the question was that it sought from the witness an opinion as to whether the particular physician whose alleged negligence was at issue had exercised that degree of skill, care and learning ordinarily possessed and exercised by physicians and surgeons practicing in Los Angeles in the treatment of similar conditions. Technically, said the court, the appellants' objection was correct. When a hypothetical question is put to an expert witness the evidence sought is not what the witness personally thinks of what was or was not done, not whether he would do or omit to do the particular act or omission charged as negligence, not whether the actual physician in the case was negligent in the commission or omission charged, but whether, in the opinion of the witness, a physician of ordinary attainments practicing in the same locality and using ordinary skill and care would have done or failed to do the thing charged. An expert witness, continued the court, gives his opinion with respect to whether the doing or not doing of a certain thing conforms to what a hypothetical physician, endowed with ordinary skill and learning and exercising ordinary care and prudence, practicing in the locality in question, would or would not do. Such an opinion, in legal supposition, is different from saying that the actual physician in a given case is skilled or unskilled, careless or careful. The expert's opinion sets up for the use of the jury or the court a hypothetical physician, by which the jury or court may test the skill of and the care used by the physician actually involved. While the hypothetical question propounded in this case did seek to elicit from the expert witness an opinion as to whether or not the particular physician exercised the required degree of care, the court was of the opinion that the objectionable form of the question did not constitute prejudicial error because, in answering the question, the witness stated: "The treatment differs from the usual treatment of these conditions." This answer, the court said, gave the jury exactly the information that the question should have called for if it had been framed correctly. While the question was incorrectly framed, the answer itself did not constitute an invasion of the province of the jury.

The appellants contended also that the plaintiff's contract called only for obstetric services to the plaintiff's wife and did not require any care for the baby. Such a distinction, the court said, is too strained to be substantial. When an obstetrician undertakes to deliver a woman of a baby, he may not devote his entire attention at the time and during the hospital confinement to the mother alone. It should be said, pointed out the court, in justice to the physicians involved in this case that they undoubtedly felt under obligation to care for the baby, since they did proceed to look after it.

The record in this case, concluded the court, substantially supported the jury's verdict for the plaintiff. The judgment of the trial court was therefore affirmed.—*Criss v. Angelus Hospital Assn. of Los Angeles (Calif.), 56 P. (2d) 1274.*

## *Society Proceedings*

### COMING MEETINGS

American Orthopsychiatric Association, New York, Feb. 18-20. Dr. George S. Stevenson, 50 West 50th St., New York, Secretary.

Annual Congress on Medical Education, Medical Licensure and Hospitals, Chicago, Feb. 15-16. Dr. William D. Cutter, 535 North Dearborn St., Chicago, Secretary.

Pacific Coast Surgical Association, Seattle, Wash., and Victoria, B. C., Feb. 24-27. Dr. H. Glenn Bell, University of California Hospital, San Francisco, Secretary.

Southeastern Surgical Congress, Louisville, Ky., March 8-10. Dr. Benjamin T. Beasley, 478 Peachtree St. N.E., Atlanta, Ga., Secretary.

Western Section, American Laryngological, Rhinological and Otological Society, San Diego, Calif., Jan. 30-31. Dr. David R. Higbee, 3245 Fourth Ave., San Diego, Calif., Chairman.

# Current Medical Literature

## AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers in continental United States and Canada for a period of three days. Periodicals are available from 1926 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them. Titles marked with an asterisk (*) are abstracted below.

### American Heart Journal, St. Louis

**12:** 511-640 (Nov.) 1936

New Method for Determining Circulation Time Throughout Vascular System. L. C. Spier, I. S. Wright, New York, and L. Saylor, Topeka, Kan.—p. 511.

Thrombo-Angiitis Obliterans of Coronary Arteries and Its Relation to Arteriosclerosis. O. Saphir, Chicago.—p. 521.

Cardiac Psychoses and Neuroses. J. C. Yaskin, Philadelphia.—p. 536.

Treatment and Immediate Prognosis of Coronary Artery Thrombosis (267 Attacks). A. M. Master, H. L. Jaffe and S. Dack, New York. —p. 549.

Study of Cardiac Outline. B. S. Epstein, Brooklyn.—p. 563.

Study of QRS Complex of Lead III in Left Axis Deviation. W. A. Sodeman, New Orleans.—p. 573.

Ectopic Tachycardia, Auricular in Origin, of Unusual Duration. H. B. Weiss and J. McGuire, Cincinnati.—p. 585.

*Cardiodynamic and Electrocardiographic Changes in Normal Pregnancy. H. Landt and J. E. Benjamin, Cincinnati.—p. 592.

**Electrocardiographic Changes in Pregnancy.** — Landt and Benjamin observed nineteen normal pregnant women throughout the course of their pregnancy and puerperium. The study included the correlation of clinical, cardiodynamic and electrocardiographic changes. The final examination (control) was taken approximately two months after delivery. The study indicates that pregnancy definitely places a burden on the cardiocirculatory system. In the normal woman this burden can be compensated by calling on the reserve capacity of this system. The method of compensation is both mechanical and physiologic in nature. The electrocardiographic changes observed during the course of pregnancy may be interpreted definitely on the basis of mechanical shifting of the heart. This shifting of the heart produced a left axis deviation in the electrocardiogram of the majority of the patients studied. The normal woman who does not develop any untoward signs or symptoms during the course of pregnancy shows a normal clinical, cardiodynamic and electrocardiographic picture from six to eight weeks after delivery.

### American Journal of Clinical Pathology, Baltimore

**6:** 521-622 (Nov.) 1936

Rôle of Clinical Pathology in Medicine. Horder, London, England. —p. 521.

*Diagnostic Value of Frei Reaction in Lymphogranuloma Inguinale. R. D'Aunoy and E. von Haam, New Orleans.—p. 529.

Simple Slide and Tube Tests for Infectious Mononucleosis. R. Straus, Cleveland.—p. 546.

Occurrence of Heterophile Antibody (Hemagglutinin) in Serum of Rabbits Showing "Serum Sickness" Reaction. H. A. Kemp and B. O. Baker, Dallas, Texas.—p. 557.

Behavior of Heterophile Antibody (Hemagglutinin) of Serum Sickness and Acute Infectious Mononucleosis to Absorption with Raw and Autoclaved Ox Erythrocytes. H. A. Kemp and B. O. Baker, Dallas, Texas.—p. 560.

Osteoblastic Sarcoma of Uterus. R. F. E. Stier, Spokane, Wash., and J. C. Lyman, Walla Walla, Wash.—p. 562.

Error of Determination of Erythrocyte Count. T. B. Magath, J. Berkson and Margaret Hurn, Rochester, Minn.—p. 568.

Hemologic Observations on Sickle Cell Anemia. E. A. Sharp and E. M. Schleicher, Detroit.—p. 580.

**Diagnostic Value of the Frei Reaction.**—The confidence of D'Aunoy and von Haam in the reliability of the Frei test has been justified by numerous cases in which animal inoculation confirmed the results of the Frei test while the clinical and biopsy diagnoses failed to reveal the true nature of the condition. During the last two years they have performed more than 1,697 Frei tests on patients with or without inguinal lymphogranuloma. Diagnosis based on the test proved correct in 90.9 per cent of 547 cases; 7.2 per cent doubtful reactions were obtained, and in 1.9 per cent apparently faulty reactions occurred. Syphilis as indicated by positive blood Wassermann reactions was present in 19.5 per cent of Frei positive cases and in 22 per cent of Frei negative cases. Acute gonorrheal and chancroidal infections were present in about 10 per cent of the Frei positive cases. Comparison of the various antigens used for the Frei test showed that antigen prepared from human gland and brain emulsions of experimentally infected marmosets give fewer doubtful reactions than do antigens prepared from diluted pus of human lesions and brain emulsions of infected mice. These results demonstrate the marked degree of specificity and the high diagnostic value of this cutaneous reaction in the recognition of inguinal lymphogranuloma in its various manifestations. The fact that 17.4 per cent of Negro patients applying because of various conditions to the Charity Hospital of Louisiana gave a positive reaction demonstrates the wide distribution of the disease among the Negro race in that locality.

### American J. Digest. Dis. & Nutrition, Fort Wayne, Ind.

**3:** 617-730 (Nov.) 1936

Cholesterol Metabolism in Jaundice. S. A. Wilkinson, Boston.—p. 618.

Biliary Stasis. C. H. Greene, J. R. Twiss and R. F. Carter, New York. —p. 622.

Treatment of Acute Hepatic Insufficiency and Its Relation to Prognosis. C. M. Jones, Boston.—p. 624.

Chronic Hepatitis with Jaundice (Biliary Cirrhosis). J. F. Weir and A. M. Snell, Rochester, Minn.—p. 629.

Macrocytic Anemia in Diseases of Liver: General Considerations. D. H. Rosenberg, Chicago.—p. 639.

Anemia and Gastro-Intestinal Tract: Synopsis. G. R. Minot, Boston. —p. 643.

Intubation Studies of Human Small Intestine: VIII. Miscellaneous Observations. T. G. Miller, W. O. Abbott and W. G. Karr, Philadelphia.—p. 647.

Components of Gastric Secretion. F. Hollander, New York.—p. 651.

Gastric Secretory Behavior in Chronic Gastritis. J. F. Monaghan, H. L. Bockus, K. Kornblum, Philadelphia, and G. R. Moffitt, Harrisburg, Pa.—p. 655.

Intracutaneous Responses, Comparable to Positive Frei Reactions, with Colonic Exudate from Chronic Ulcerative Colitis Cases with Positive Frei Tests. M. Paulson, with technical assistance of Betty Kravetz, Baltimore.—p. 667.

*Diagnostic Significance of Antidysentery Bacteriophage. T. T. Mackie, New York.—p. 673.

Certain Aspects of Applied Physiology of External Pancreatic Secretion. A. C. Ivy, Chicago.—p. 677.

Diseases of Pancreas: Clinical Aspect. T. R. Brown, Baltimore.— p. 682.

Surgical Aspects of Diseases of Pancreas. D. F. Jones, Boston.—p. 686.

Thoracic Stomach with Short Esophagus and Diaphragmatic Hernia. L. Bloch, A. M. Serby and S. Salinger, Chicago.—p. 689.

*Specific Food Sensitiveness. W. C. Alvarez, Rochester, Minn.—p. 693.

Certain Newer Methods of Treating Peptic Ulcer. A. B. Rivers, Rochester, Minn.—p. 698.

Cystadenomas of Pancreas: Surgical Report. B. F. Carter and L. Slattery, New York.—p. 705.

**Diagnostic Significance of Antidysentery Bacteriophage.**—Mackie is not impressed by the incidence of specific bacteriophage in association with chronic bacillary dysentery. Only 29 per cent of the cases with acceptable evidence of infection by Shigella dysenteriae exhibited a lytic principle action against these organisms. An antidysentery bacteriophage was found accompanying positive culture in only 34.7 per cent of eighty-four cases. Moreover, his experience leads him to question seriously the specificity of such a lytic principle. A bacteriophage active against his laboratory strains was obtained in 12.8 per cent of eighty-six control cases. None of these could be suspected of infection by Shigella dysenteriae on cultural or serologic grounds, and, with the possible exception of the cases of chronic ulcerative colitis, none could be suspected on clinical grounds. Antidysentery bacteriophage has been found in the control cases in association with such diverse conditions as achlorhydria, acute appendicitis, arsphenamine hepatitis, foreign body in the liver, intestinal protozoal infection and chronic ulcerative colitis. The clinical and bacteriologic significance of antidysentery bacteriophage in chronic intestinal infections is not as yet sufficiently well defined to justify the term "diagnostic bacteriophage."

**Specific Food Sensitiveness.**—Alvarez believes that food sensitiveness should be looked for carefully whenever the symptoms of abdominal distress point to the presence of an oversensitive colon, when they are vague or unusual or whenever careful examination fails to reveal any sign of disease in the duodenum, stomach, gallbladder or appendix. The diet must be studied in every case of true flatulence or bloating, and food

sensitiveness looked for in some cases of migraine. It seems probable that in some cases constipation is due to the irritation of the colon by certain foods, and in some the symptoms of cholecystitis, ulcer or appendicitis can be imitated with great fidelity. It does not seem logical to assume that most of the annoyances that follow the eating of particular foods are allergic in origin and due to protein. There must be druglike substances in certain foods which can upset the digestive tract in much the same way as a small dose of emetic or purgative. Whether or not one accepts the view that food senistiveness is usually due to the protein in the food, the author cannot see why one should make strenuous efforts to purify the allergens used for skin testing. He believes that the best results should be expected with antigens obtained by the simplest treatment of the foods. It is neither logical nor necessary to keep a patient on a narrow elimination diet for weeks or months, as such diets are for diagnostic and not for therapeutic purposes. Sometimes positive skin tests can actually be a nuisance to both the patient and the physician as such blind and unswerving faith is put in them. The digestibility of a food may at times be much more important to a patient than is its content of vitamins or calcium or iron.

## American Journal of Hygiene, Baltimore

**24:** 447-604 (Nov.) 1936

*Antitoxin Content of Serum Two Years After Antidiphtheria Inoculations. F. Faragó, Budapest, Hungary.—p. 447.

Tuberculin Survey of Upper Aucaner Bush Negroes in Dutch Guiana. M. C. Kahn, New York.—p. 456.

Epidemiology of Human Ascariasis in Metropolitan Area of New Orleans, Louisiana. W. H. Headlee, New Orleans.—p. 479.

Study of an Outbreak of Type II Pneumococcus Pneumonia in the Veterans' Administration Hospital at Bedford, Mass. W. G. Smillie, Boston.—p. 522.

Tuberculosis Incidence Among White Persons and Negroes Following Exposure to Disease. Persis Putnam, Philadelphia.—p. 536.

Study of Diarrhea and Dysentery in Henrico County, Virginia. G. F. McGinnes, A. L. McLean, F. Spindle and K. F. Maxcy, Richmond, Va.—p. 552.

Diphtheria in Baltimore: Comparative Study of Morbidity, Carrier Prevalence and Antitoxic Immunity in 1921-1924 and 1933-1936. W. H. Frost, M. Frobisher Jr., V. A. Van Volkenburgh and M. L. Levin, Baltimore.—p. 568.

Is There Dermatitis in Egyptian Schistosomiasis? C. H. Barlow, Cairo, Egypt.—p. 587.

**Antitoxin in Serum After Antidiphtheria Inoculations.**—In terms of antitoxin units per cubic centimeter of serum, Faragó observed that the average antitoxin serum content of blood, tested two years after immunizing inoculation with Ramon toxoid and toxoid precipitate, of individuals from four different districts of Hungary, was 0.68 for a group of forty-nine individuals, 0.257 for fifty, 0.562 for forty-seven and 0.567 for fifty-five. In the four groups subjected to tests the serum antitoxin content corresponded to the results of Schick reactions, although in one group the correspondence was not close. The level at which both Schick positive and negative reactions were obtained in three groups was 0.009 antitoxin unit per cubic centimeter of serum. Owing to probable technical errors it was impossible to define a level in the other group. Two years following immunization, immunity in three groups averaged, according to Schick reactions, 91.4 per cent, and according to antitoxin determination, 90.73 per cent. In one group the corresponding percentages were 86 and 76 per cent.

## American Journal of Ophthalmology, St. Louis

**19:** 951-1052 (Nov.) 1936

New Operation for Chronic Glaucoma: Restoration of Physiologic Function by Opening Schlemm's Canal Under Direct Magnified Vision. O. Barkan, San Francisco.—p. 951.

Investigation of Angular Relation of Visual (Visierlinie) and Optic (Corneal) Axes of the Eye. G. E. Park, Chicago.—p. 967.

Observations on Reducing Substances (Glucose) of Aqueous and Vitreous Humors of the Eye. W. M. James and A. J. Siefker, St. Louis.—p. 975.

Keratoconjunctivitis with Adenitis in Calcutta. S. Sanyal, Calcutta, India.—p. 982.

Orthoptic Treatment of Strabismus. J. L. Bressler, Houston, Texas.—p. 989.

Visual Tasks in Sight-Saving Classes. M. Luckiesh and F. K. Moss, Cleveland.—p. 992.

Failures and Successes in Operative Treatment of Detachment of Retina. T. D. Allen, Chicago.—p. 1000.

## American Journal of Physiology, Baltimore

**117:** 381-576 (Nov.) 1936. Partial Index

Ovarian Hormone Threshold for Experimental Menstruation in Monkeys. E. Allen, A. W. Diddle, T. H. Burford and W. U. Gardner, New Haven, Conn.—p. 381.

Tetany of Estrus in Parathyroidectomized Dog. E. I. Evans, S. Szurek and R. Kern, Chicago.—p. 405.

Cardiovascular Reactions Induced by Electrical Stimulation of Cerebral Cortex. E. C. Hoff and H. D. Green, New Haven, Conn.—p. 411.

Effect of Intravenous Administration of Protamine Insulin. B. B. Longwell and A. Ravin, Denver.—p. 453.

Measurement of Serum Volume. F. W. Sunderman and J. H. Austin, Philadelphia.—p. 474.

Effect of Lactation and Exercise on Rate of Involution of Uterus in Rat. Elizabeth Abbott and A. C. Ivy, Chicago.—p. 487.

Crossed Respiratory Impulses to Phrenic. A. Rosenblueth and T. Ortiz, Boston.—p. 495.

Thyrotropic Effect of Pituitaries from Cretin Rats. I. T. Zeckwer, Philadelphia.—p. 518.

Origin of Fecal Fat in Absence of Bile, Studied with Deuterium as an Indicator. A. Shapiro, H. Koster, D. Rittenberg and R. Schoenheimer, New York.—p. 525.

Comparison of Chemical Composition of Stimulated and Resting Saliva of Caries-Free and Caries-Susceptible Children. J. White and R. W. Bunting, Ann Arbor, Mich.—p. 529.

Gastric Acidity Following Partial Gastrectomy and Vagotomy. C. M. Wilhelmj, H. H. McCarthy and F. C. Hill, Omaha.—p. 533.

Further Study of Relation of Adrenal Cortex to Vitamin C. Julia E. Lockwood, Buffalo; D. R. Swan, Columbus, Ohio, and F. A. Hartman, Buffalo.—p. 553.

## Archives of Ophthalmology, Chicago

**16:** 733-918 (Nov.) 1936

*Treatment of Retinal Gliomas by Fractionated or Divided Dose Principle of Roentgen Radiation: Preliminary Report. H. E. Martin and A. B. Reese, New York.—p. 733.

Biochemistry of Lens: IX. Influence of Vitamin C and Sulfhydryls on Production of Galactose Cataract. J. G. Bellows, Chicago.—p. 762.

Complications of Forceps Intracapsular Operation for Cataract: Based on Analysis of 500 Successive Cases. A. Knapp, New York.—p. 770.

Dermoid Cysts of Orbit. B. Samuels, New York.—p. 776.

Comparative Anatomy of Eye. A. Hagedoorn, Amsterdam, Netherlands.—p. 783.

Bilateral Metastatic Carcinoma of Choroid: Successful Roentgen Treatment of One Eye. A. N. Lemoine and J. McLeod, Kansas City, Mo.—p. 804.

Method for Correction of Entropion in Trachomatous Patients, with Particular Attention to Esthetic Results. A. Busacca, São Paulo, Brazil, South America.—p. 822.

Anomalous Ophthalmic Artery with Ocular Symptoms. A. O. Pfingst, Louisville, Ky.—p. 829.

Neosynephrin Hydrochloride: Some Uses and Effects in Ophthalmology. P. Heath, Detroit.—p. 839.

*Early Ocular Complications of Epidemic Meningitis. N. K. Lazar, Chicago.—p. 847.

**Treatment of Retinal Gliomas by Roentgen Radiation.**—Since a few small or massive doses of radiation had not given reasonable success in the treatment of retinal gliomas in the past, Martin and Reese employed a highly fractionated large total dose. To spare the eye from the undesirable and even serious effects of a large dose of radiation, they used small circular portals, accurately directed so as to confine the beam of roentgen radiation as much as possible to the region of the growth itself. The radiation was given as frequently and in as large doses as was compatible with the maintenance of the integrity of the local normal structures and with the health and comfort of the child. Up to this time, in a series of six consecutive cases, they have had no failures. In two patients the disease has been controlled for three years with satisfactory vision in the treated eye. The final proof in the permanent control of retinal glioma must await the time when several cases have passed the five year period.

**Ocular Complications of Epidemic Meningitis.**—Lazar encountered thirty-three cases of ocular complications of major importance in a total of 266 cases of meningitis occurring in 1933. During the early part of this year it had been customary to inject the antimeningococcus serum only intraspinally. This may have accounted for the large number of ocular complications seen during this period. About the middle of March the patients received the serum intravenously in much larger quantities. From then on during 1933 the number of ocular complications was reduced considerably. Most of the patients with the complication of paresis of the external rectus muscle still had the paresis on discharge from the hospital. Some of these

patients were later observed in the clinic for patients with diseases of the eye. The paresis cleared up completely. During 1934, among ninety-eight patients with epidemic meningitis six ocular complications were observed. Every third patient received meningococcus antitoxin by vein. Aside from the fact that the epidemic was mild as compared to that of 1933, none of the patients who received the antitoxin showed intra-ocular complications. Those receiving the serum did. During 1935 only five ocular complications were observed in 211 cases of epidemic meningitis. Most of the patients were then receiving the antitoxin intravenously, and a few spectacular recoveries from intra-ocular complications were observed. From the observations made there appears to be no doubt that ocular complications of epidemic meningitis are due to an infection of the blood stream, reaching the posterior segment through the retinal or choroidal vessels, or both. The two major ocular complications are endophthalmitis and paresis of the external rectus muscles. Treatment of the disease with an antitoxin has reduced greatly the number of ocular complications. Local treatment is without avail, once the posterior segment has become involved. This is especially true when the serum is employed. Microscopic examination in cases of endophthalmitis complicating epidemic meningitis shows nothing that distinguishes the condition from endophthalmitis due to other blood-borne infections.

## Arch. of Physical Therapy, X-Ray, Radium, Chicago

**17:** 673-736 (Nov.) 1936

*Short Wave Diathermy in Heating of Human Tissues. J. S. Coulter and S. L. Osborne, Chicago.—p. 679.
Ultrashort Wave Diathermy in Pyogenic Infections. W. J. Egan, Milwaukee.—p. 688.
*Vitamin D and Fever Therapy in Chronic Arthritis. S. K. Livingston, Hines, Ill.—p. 704.
Medical Diathermy in Rectal Stricture. R. V. Gorsch, New York.—p. 706.
Physical Therapy Procedures in Otology. E. G. Linn, Des Moines, Iowa.—p. 708.
Some Physical and Clinical Aspects of Ultrashort Waves. C. K. Gale, New York.—p. 712.

**Short Wave Diathermy in Heating Tissues.**—Coulter and Osborne emphasize that experiments on phantom model and on dead animal tissues cannot be used to prove the effects of short wave diathermy on living human tissues. Experiments on twelve medical students confirmed previous studies that there were no significant differences of one wavelength over another within the range of 6 to 25 meters in the heating of live human muscle and fat tissues. Under aseptic precautions a nonmagnetic nonconducting sheath was inserted subcutaneously and into the quadriceps extensor muscle. The intensity of the current was governed by the patient's comfort. There were no significant differences in the use of 6, 12, 15, 18 and 24 meter wavelengths when using the cuff technic of the electric field method, and no significant differences in the use of 12, 18, 24 and 25 meter wavelengths when using the coil technic of the electromagnetic field. In the studies of tissue heating with air-spaced electrodes with the electric field the efficiency of heating is dependent on the size of the electrodes, the energy available from the apparatus, the method of application, the distance of the electrodes from the skin and the patient's tolerance (comfort).

**Vitamin D and Fever Therapy in Chronic Arthritis.**—Livingston treated twenty-two patients having severe arthritis of various types with from 200,000 to 600,000 international units daily of vitamin D only or with vitamin D and weekly fever therapy. Nineteen patients showed clinical improvement, one discontinued the treatment and two showed no improvement. Former observations revealed that fever therapy alone was not effective. Fever therapy when employed in conjunction with vitamin D caused more rapid clinical improvement than vitamin D alone. When toxic symptoms appear, the drug should be discontinued at once for two weeks. So far as could be observed, there is no contraindication to this form of therapy. The blood chemistry and blood picture remain within normal limits with the exception of a decreased sedimentation rate and a shift in the Schilling test toward the right. Arthritis is probably associated in part with a vitamin D deficiency. The mechanism of this therapy is not understood.

## Arkansas Medical Society Journal, Fort Smith

**33:** 117-134 (Dec.) 1936

*X-Ray Therapy in Infections. D. A. Rhinehart, Little Rock.—p. 117.
Present Status of Vaccine and Serum Therapy in Acute Contagious Diseases. A. G. Cazort and J. N. Compton, Little Rock.—p. 119.

**Roentgen Therapy in Infections.**—Rhinehart mentions a case of carbuncle, thyroiditis and unresolved pneumonia in which roentgen irradiation proved efficacious. To these three cases he could add any number showing the beneficial effects of radiation therapy in the treatment of acute and chronic infections. Furuncles and boils in any region usually respond promptly to a single short roentgen treatment. Unless the patient is diabetic, roentgen treatment of a carbuncle in any locality usually gives a spectacular result. Acute infections in the lymph nodes of the neck following an acute tonsillitis or an acute infection of the upper part of the respiratory tract in children respond to one or two treatments. In spite of the benefits following this form of therapy, the exact action is yet empirical. In the radiation treatment of acute infections, the doses are always small. In acute conditions often a single application is sufficient. If not, the treatment may be repeated two or three times at intervals of two days. In chronic infections the period of treatment must be more prolonged; usually weekly treatments are given until beneficial results have been obtained. Because of the small amounts of radiation that are used, there is no danger of damage to any of the normal tissues, and permanent skin damage does not occur.

## Journal of Experimental Medicine, New York

**64:** 831-994 (Dec.) 1936

Studies on Soluble Precipitable Substances of Vaccinia: III. Precipitin Responses of Rabbits to LS Antigen of Vaccinia. F. O. Wishart and J. Craigie, Toronto.—p. 831.
Immunologic Studies on New Preparation of Type Specific Polysaccharide from Pneumococcus Type I. B. F. Chow, Peiping, China.—p. 843.
Lipids and Immunologic Reactions: IV. Lipid Patterns of Specific Precipitates from Type I Antipneumococcus Serums. F. L. Horsfall Jr. and K. Goodner, New York.—p. 855.
Quantitative Technic for Performing Plasmapheresis. D. Melnick and G. R. Cowgill, with cooperation of Ethel Burack, New Haven, Conn.—p. 865.
*Influence of Diet on Regeneration of Serum Protein: I. Standardization of Experimental Technic. D. Melnick, G. R. Cowgill and Ethel Burack, New Haven, Conn.—p. 877.
Id.: II. Potency Ratios of Serum Protein, Lactalbumin and Casein, and Effect of Tissue Protein Catabolism on Formation of Serum Protein. D. Melnick, G. R. Cowgill and Ethel Burack, New Haven, Conn.—p. 897.
Experimental Nephritis in Rats Induced by Injection of Anti-Kidney Serum: I. Preparation and Immunologic Studies of Nephrotoxin. J. E. Smadel, New York.—p. 921.
Tissue Culture Studies on Bacterial Hypersensitivity: III. Persistence in Vitro of Inherent Sensitivity to Tuberculin of Cells from Tuberculous Animals. J. K. Moen, New York.—p. 943.
Effect of Pneumococcus Autolysate Antitoxin on Pneumococcus Pneumonia in Guinea-Pigs. Julia T. Weld and Helena Gilder, New York.—p. 953.
Effect of Experimental Reduction of Kidney Substance on Parathyroid Glands and Skeletal Tissue. A. M. Pappenheimer, with assistance of Anna Hart, New York.—p. 965.

**Influence of Diet on Regeneration of Serum Protein.**—By quantitative plasmapheresis, Melnick and his associates investigated the effects of single proteins in artificial synthetic diets with respect to their value in promoting the regeneration of serum protein. The ratio of the amount of serum protein per week removed by bleeding above that regenerated by the dog, when eating the protein-free diet, to the dietary protein increment (i. e., above that required for nitrogen equilibrium) was termed the potency ratio. The results indicated that serum protein was slightly superior to casein and lactalbumin in promoting the regeneration of serum protein. However, the respective potency ratios, varying from approximately 0.51 to 0.36, were comparable and not widely divergent to those reported by others. Whereas in some individuals dietary proteins may be able to produce a significant increase in the serum protein concentration, the potency ratios are not sufficiently different to warrant the administration of any one protein in preference to another. The inhibitory effect of the basal protein-free diet with respect to serum protein regeneration in the dog was demonstrated also by the inability of the protein concentration to attain the normal level in spite of discontinued plasmapheresis. However, a subsequent fasting period resulted in a progressive rise in the serum protein concentration until the

normal value was approximated. These observations indicate that the products of tissue protein catabolism can be utilized in the formation of new serum protein. The experimental production of what seems to be an inhibition of the serum protein regenerating mechanism suggests that the most profitable line of approach to solution of the problem of hypoproteinemia lies not so much in the evaluation of dietary factors as in finding a way for stimulating internally the serum protein regenerating mechanism, which seems to involve in some manner the capacity of the tissue to furnish protein for the needs of the plasma.

## Journal of General Physiology, New York

**20:** 145-310 (Nov. 20) 1936. Partial Index

Studies on Cell Metabolism and Cell Division: I. Relation Between Molecular Structures, Chemical Properties and Biologic Activities of Nitrophenols. G. H. A. Clowes and M. E. Krahl, Woods Hole, Mass.—p. 145.

Id.: II. Stimulation of Cellular Oxidation and Reversible Inhibition of Cell Division by Dihalo and Trihalophenols. M. E. Krahl and G. H. A. Clowes, Woods Hole, Mass.—p. 173.

Intensity Discrimination in Human Eye: I. Relation of Δ I/I to Intensity. J. Steinhardt, New York.—p. 185.

Effect of Hemolytic Substances on White Cell Respiration. E. Ponder and J. Macleod, Cold Spring Harbor, Long Island, N. Y.—p. 267.

## Journal of Immunology, Baltimore

**31:** 347-420 (Nov.) 1936

Study of Blood Grouping Factors in Horses. V. A. Herman, Kharkov, U. S. S. R.—p. 347.

Alum-Precipitation of Diphtheria Toxoid (Improvement of Diphtheria Alum-Toxoid). K. Ando, T. Komiyama and K. Manako, Dairen, Manchuria.—p. 355.

Active Immunization Against Tetanus Infection with Refined Tetanus Toxoid. D. H. Bergey and S. Etris, Philadelphia.—p. 363.

Active Immunization to Scarlet Fever by Intracutaneous Method. J. H. Robinson, Huntington, W. Va.—p. 373.

Blood Grouping of 336 Upper Aucaner Bush Negroes and Seventy Alukuyana Indians in Dutch Guiana. M. C. Kahn, New York.—p. 377.

*Observations on Interpretation of Schick Tests: Comparison of Schick Test Interpretations Using Different Products on the Same Individual Simultaneously. K. F. Brandon and D. T. Fraser, Toronto.—p. 387.

Observations on Dissociation of Meningitic Strains of Haemophilus Influenzae. L. D. Fothergill and Caroline A. Chandler, with technical assistance of Margaret Spencer, Boston.—p. 401.

Further Studies on Relation of Heterophile Immunity to Incidence of Colds. G. E. Rockwell and H. C. Van Kirk, Cincinnati.—p. 417.

**Interpretation of Schick Tests.**—Brandon and Fraser determined whether there was consistent agreement between the reactions to different Schick products of licensees of the Treasury Department of the United States. Of the eighty-seven individuals Schick tested each with six different products, thirty (34 per cent) showed inconsistencies and twenty-three (26 per cent) showed frank disagreement in the readings. Reactions to the toxins of the Schick outfits were remarkably consistent with the exception of one product. Errors in interpreting the "Schick immunity" were usually due to the inconsistent reactions ensuing on the Schick control. False interpretations of the Schick test are made most frequently in the group of persons skin sensitive to diphtheria protein. Products containing dilute toxoid as a Schick control were the only ones that resulted in no errors of interpretation of the Schick immunity of the persons tested. All products using heated toxin as a control gave some false results. The observations substantiate the fact that the antitoxin level of Schick immunity lies between 1/500 and 1/250 of a unit of antitoxin, when the Schick test material conforms to the standard recommended by the League of Nations.

## Journal Industrial Hygiene and Toxicology, Baltimore

**18:** 583-688 (Nov.) 1936

Electrotor Dust and Smoke Meter. S. C. Blacktin, Roundhay, Leeds, England.—p. 583.

Design of Exhaust Hoods for Dust-Control Systems. T. Hatch, Boston.—p. 595.

Toxic Organic Vapors and Gases. J. H. Foulger, Wilmington, Del.—p. 604.

Laboratory of Industrial Toxicology. W. F. von Oettingen, Wilmington, Del.—p. 609.

Industrial Hygiene Laboratory. W. A. Cook, Hartford, Conn.—p. 623.

Carbon Monoxide Poisoning. C. K. Drinker, Boston.—p. 637.

*Heat Disease: Clinical and Laboratory Study. M. W. Heilman and E. S. Montgomery, Tarentum, Pa.—p. 651.

Toxic Dusts and Fumes. L. T. Fairhall, Boston.—p. 668.

**Study of Heat Disease.**—Heilman and Montgomery present thirteen cases of heat disease (six of heat cramps, three of heat exhaustion, three of heat retention and one of mixed cramp and exhaustion) selected as the most severe clinical forms of heat disease from a total of 184 cases. Heat regulation must be considered from the mechanism of heat production and of the factors involved in the control of heat production and from the mechanism of heat dissipation and of the factors involved in this process. Sensitiveness to external heat varies greatly in different individuals and may be increased by fatigue, alcohol, rich protein diet, gastro-intestinal disorders and particularly circulatory disease. Continued exposure to heat frequently appears to increase tolerance, but this may be explained for the most part by conservation of energy, increased muscular efficiency and more intelligent food intake. But there also are individuals in whom exposure to excessive heat of the sheet floor breaks down tolerance to heat, and symptoms of heat disease result. The heat retention cases were pathologic in that they did not react to the environment of the sheet floor in a physiologic manner. This failure of normal perspiration and heat regulation resulted in heat retention. The heat cramps and heat exhaustion cases differed from the control group of steel workers only in the severity of dehydration and chemical changes in the blood. It is rational that the failure of the thermolytic center causes an underactivity of heat dissipation and the excess heat is retained and accumulates to the point of producing clinical signs and symptoms. When the temperature exceeds 98.3 F., loss of heat by radiation and conduction ceases and external regulation of the body temperature depends solely on convection and evaporation of perspiration. The men who suffered with heat retention came to work, perspired profusely for a short time, usually only a few hours, and then ceased to sweat, while others came to work and could not perspire on the day they were admitted to the hospital suffering with heat retention.

## Journal of Pharmacology & Exper. Therap., Baltimore

**58:** 199-360 (Nov.) 1936

Studies on Barbiturates: XIX. Analysis of Barbiturate-Picrotoxin Antagonism. T. Koppanyi, C. R. Linegar and J. M. Dille, Washington, D. C.—p. 199.

Pharmacologic Contributions to the Problem of Autonomic Control of Skeletal Muscle Tonus. S. Loewe, New York.—p. 229.

Toxicity of Strychnine for Male and Female Rats of Different Ages. C. F. Poe, J. F. Suchy and N. F. Witt, Boulder, Colo.—p. 239.

*Studies of Cyclopropane: I. Quantitative Determination of Cyclopropane in Air, Water and Blood by Means of Iodine Pentoxide. B. H. Robbins, Nashville, Tenn.—p. 243.

Id.: II. Concentrations of Cyclopropane Required in Air and Blood for Anesthesia, Loss of Reflexes and Respiratory Arrest. B. H. Robbins, Nashville, Tenn.—p. 251.

Effect of Zinc and Aluminum on Hypoglycemic Action of Insulin. J. F. Fazekas and H. E. Himwich, Albany, N. Y.—p. 260.

Temporary Paralysis of Vagus Mechanism in Turtle Heart by Sodium Citrate and Sodium Oxalate. G. D. Shafer, Stanford University, Calif.—p. 264.

Paralyzing Effects of Sodium Citrate on Cardiac Vagus and on Heart Muscle of Cat. G. D. Shafer and J. M. Crismon, Stanford University, Calif.—p. 274.

Quantitative Studies with Thyrotropic Hormone. W. K. Cuyler, B. F. Stimmel and D. R. McCullagh, Cleveland.—p. 286.

Effect of Coffee and Decaffeinated Coffee on Oxygen Consumption, Pulse Rate and Blood Pressure. Kathryn Horst, R. J. Willson and R. G. Smith, Ann Arbor, Mich.—p. 294.

Bile Acids in Icterus Produced by Tolulendiamine. J. M. McGowan, J. L. Bollman and F. C. Mann, Rochester, Minn.—p. 305.

Effect of Adrenalin on Duration of Ventricular Fibrillation in Cat After Administration of Ergotamine. D. C. Smith, Memphis, Tenn.—p. 312.

Propylene Impurities: Hexenes and Hexanes. V. E. Henderson and A. H. R. Smith, Toronto.—p. 319.

Note on Methylcholines. R. Hunt, Boston.—p. 328.

Pharmacologic Action of Alkaloids of Fumaraceous Plants: III. Dicentrine Methine Hydrochloride. R. A. Waud, London, Ont.—p. 332.

Comparative Study of Effects of Five Choline Compounds Used in Therapeutics: Acetylcholine Chloride, Acetyl Beta-Methylcholine Chloride, Carbaminoyl Choline, Ethyl Ether Beta-Methylcholine Chloride, Carbaminoyl Beta-Methylcholine Chloride. H. Molitor, Rahway, N. J.—p. 337.

**Quantitative Determination of Cyclopropane in Blood.**—Robbins studied the concentrations of cyclopropane in the blood necessary for anesthesia or for death. The method used was a slight modification of that used by Haggard and Greenberg for ethyl alcohol. The distribution ratio of cyclopropane between water and air over a temperature range of from 20 to 45 C. and that between blood and air over a temperature range of from 20 to 40 C. has been determined. The solubility of cyclopropane in the blood of the human being and the dog is

about two and one-half times as great as its solubility in water (20.8 cc. of gas per hundred cubic centimeters of water at 35 C.) at corresponding temperatures and pressure.

## Missouri State Medical Assn. Journal, St. Louis

**33:** 439-480 (Dec.) 1936

The Management of Injuries to Spine and Pelvis. E. P. Heller, Kansas City.—p. 439.
Breech Delivery. S. D. Soule, St. Louis.—p. 449.
Modern Trend in Treatment of Staphylococcic Infections. C. R. Ferris, Kansas City.—p. 453.
Traumatic Rupture of Normal Spleen—Splenorrhaphy—Recovery. G. A. Aiken, Marshall.—p. 456.

## Nebraska State Medical Journal, Lincoln

**21:** 441-476 (Dec.) 1936

Treatment of Brain Edema. R. H. Young, Omaha.—p. 441.
Hypertensive Heart Disease. O. V. Calhoun, Lincoln.—p. 446.
Present Status of Gastric Surgery. E. A. Connolly, Omaha.—p. 449.
Derangements of Coccyx. H. F. Johnson, Omaha.—p. 451.
Treatment of Chronic Infectious Arthritis: Practical Working Conception. M. J. Breuer, Lincoln.—p. 457.
*Degenerative Myositis from Melitensis Infection: Report of One Case. A. F. O'Donoghue and W. Scott, Sioux City, Iowa.—p. 462.

**Degenerative Myositis from Melitensis Infection.**—O'Donoghue and Scott report a case of degenerative myositis in a farmer, aged 25, who, when first seen, complained of pain in the back which he stated began a week before, following a mild angina. The pain, he stated, was of a deep burning type and practically constant. The oral temperature reached 102 F. on several occasions, but there had been no chills. Other symptoms complained of were anorexia, lassitude and periodic mental confusion. Examination showed that the deep muscles of the back were in spasm, and there was tenderness along the entire dorsal and lumbar regions with restricted motions in all directions. Agglutinations for malta fever were positive in dilutions of 1 : 320. The intradermal reaction to malta fever likewise was strongly positive. A diagnosis of malta fever spondylitis was made, the patient was hospitalized and 50 cc. of convalescent goat serum was given intravenously. Brucellin injections were begun four days later and continued every three days for ten doses. The patient began having severe pain in both shoulders, which radiated downward to the deltoid tubercles. This continued for one week and then disappeared. About five weeks later the patient noticed that the scapulae were becoming more prominent and that the shoulder motions were becoming weak. Reexamination showed a marked atrophy of the supraspinatus and infraspinatus muscles and of the deltoids to a moderate extent. Abduction and external rotation were diminished, but there were no actual paralyses present. The forearms were strong and showed no signs of wasting or of sensory impairment. A biopsy from the right infraspinatus muscle showed a very marked degeneration of the muscle fibers with interstitial round cell infiltration. Cultures from the muscle remained sterile after ten days. Physical therapy was instituted, but improvement could not be noted. The patient was again hospitalized and placed in the inductotherm, and good thermal reactions up to 105 F. for eight hours were obtained on three occasions. A checkup three months later revealed that all pain and tenderness had disappeared, all motions of the shoulder were powerful, the spine was limber and the muscles over the scapulae had filled out remarkably.

## Ohio State Medical Journal, Columbus

**32:** 1169-1276 (Dec.) 1936

Etiology and Therapy of Biliary Tract Disease from Point of View of Applied Physiology. A. C. Ivy, Chicago.—p. 1185.
Recent Advances in Bacteriology Pertaining to Pediatrics. M. L. Cooper, Cincinnati.—p. 1190.
Study of Our Present Methods to Combat Diphtheria. H. H. Pansing, Dayton.—p. 1194.
The Care of Lacerated Wounds. R. B. Tucker, Toledo.—p. 1198.
Cephalic Attitude During Forceps Extraction. W. P. Gillespie, Cincinnati.—p. 1202.
Chronic Endemic Dental Fluorosis in Ohio. A. L. Van Horn, Columbus.—p. 1207.
Diagnosis of Spontaneous Subarachnoid Hemorrhage. S. Baumoel, Cleveland.—p. 1211.
Neurolabyrinthitis. G. W. Mackenzie, Philadelphia.—p. 1214.
Extramedullary Hemangioblastoma of Cauda Equina: Report of Case with Notes on Histologic Appearance of Tumor. O. A. Turner and R. R. Renner, Cleveland.—p. 1219.
Therapeutic Use of Oxygen. K. C. McCarthy, Toledo.—p. 1223.
Allergy in Practice. D. L. Engelsher, New York.—p. 1229.
Garlic Breath Odor. C. T. Silverstine, Cincinnati.—p. 1233.

## Pennsylvania Medical Journal, Harrisburg

**40:** 63-166 (Nov.) 1936

Hernia. F. W. Bancroft, New York.—p. 63.
*Bromide Delirium. M. Levin, Harrisburg.—p. 70.
Measures for Control of Syphilis. E. S. Everhart, Harrisburg.—p. 75.
Medical Inspection versus Medical Examination in Public Schools. W. J. Larkin, Scranton.—p. 77.
Pediatric Education and the Practice of Medicine. J. Stokes Jr., Philadelphia.—p. 78.

**Bromide Delirium.**—Levin bases his discussion on thirty-four cases of bromide delirium that occurred in 1,399 first admissions to the Harrisburg State Hospital during a period of five years. All but four patients were more than 40 years of age. A distinction is made between bromide intoxication and delirium. Intoxication is said to exist when the concentration of bromide in the serum is 150 or more mg. of sodium bromide per hundred cubic centimeters. The most convenient method of determination is the Walter-Hauptmann test. With a given degree of intoxication, the occurrence of delirium is assumed to depend on the resistance of the patient. Resistance here means the stability of the highest cerebral centers—their ability to function normally in spite of the paralytic or depressant action of the poison. In the thirty-four cases, bromide delirium was about two and one-half times as common in women as in men. Delirium is a condition marked by dulness, drowsiness, restlessness, thinking difficulty, disorientation, mood disturbances (usually fear), delusions, hallucinations and illusions. Disorientation is essential to the picture; the others may or may not be present—at least, they may or may not be demonstrable. Subjective visual disturbances occurred in many cases and disturbances in equilibrium sense were frequent. After bromides are discontinued, the length of time required for the delirium to disappear varies in most cases from two to six weeks. In a diagnosis of bromide delirium the patient must have a bromide intoxication, the delirium must have begun after the intoxication was already under way and the delirium must disappear within a short time—usually a few weeks, rarely more than two months—after the discontinuance of the drug. Even though a patient has both delirium and bromide intoxication, the latter is not always the sole cause of the former, since there may be additional causes, such as intoxication with other drugs, chronic alcoholism, and metabolic and febrile diseases. In the treatment of bromide delirium the patient should be put to bed immediately and kept there till the delirium is over. If the patient is unduly restless he should be given continuous baths, if available. If sleep is poor, hypnotics should be given, but with great caution. Fluids should be forced moderately. The diet should be soft. Bromides should be discontinued at once. Sodium chloride should be given, provided there is no nephritis. Spinal drainage may be performed to relieve a possible increased intracranial pressure. As in any psychosis, the patient should be watched and the possibility of suicide guarded against.

## Radiology, Syracuse, N. Y.

**27:** 521-650 (Nov.) 1936

Heart Measurements. Elizabeth Newcomer and N. B. Newcomer, Denver.—p. 521.
Pneumoradiography of Knee: Newer Technic Demonstrating Its Value in Diagnosis of Semilunar Cartilage Injury. H. T. Simon, A. S. Hamilton and C. L. Farrington, New Orleans.—p. 533.
Roentgenographic Demonstration of True Articular Space. B. P. Widmann and W. R. Stecher, Philadelphia.—p. 541.
Concurrence of Osteogenic Sarcoma in Two Sisters. E. A. Pohle, W. D. Stovall and H. N. Boyer, Madison, Wis.—p. 545.
Colospasm: Its Roentgen Demonstration and Differentiation. A. Galambos and W. Mittelmann, New York.—p. 549.
*Historadiography: A New Application of X-Rays. P. Lamarque, Montpellier, France.—p. 563.
Biologic Measurement of Gamma Rays in "Equivalent Roentgens." P. S. Henshaw and D. S. Francis, New York.—p. 569.
Pneumothorax in the New-Born: Review of Literature and Report of Seven Cases. E. J. Bertin, Philadelphia.—p. 584.
Madelung's Deformity of Wrist: Report of Case. E. M. Claiborne, New York, and F. G. Kautz, San Francisco.—p. 594.
Some Lawsuits I Have Met and Some of the Lessons to be Learned from Them (Eleventh Instalment). I. S. Trostler, Chicago.—p. 600.

**Historadiography.**—Lamarque outlines a new method to obtain roentgenograms of microscopic sections by the use of very soft x-rays. It is carried out in a vacuum. Special photographic emulsions are utilized which allow greater enlargements. The images obtained, which are examined micro-

scopically, have already shown special new aspects which will be of great importance in histologic examinations. The method enlarges the domain of medical histology. It introduces new elements in the physical and chemical nature of cellular constituents. Absorption zones correspond to regions of small atomic weight, and vice versa. This new process will make possible information on the density of cellular constituents. With the aid of a new chemical agent it will be easy to render opaque a particular cellular region and to study it better, as color does not play a part here; the range of useful agents being greater and at the same time the technic being much more simple, the field of histochemistry will be enlarged.

## Southern Surgeon, Atlanta, Ga.

**5:** 407-490 (Dec.) 1936

Acute Metastatic Brain Abscess. J. E. J. King, New York.—p. 407.
Retrodisplacements of Uterus. W. T. Black, Memphis, Tenn.—p. 438.
Relationship of Calcified Mesenteric Glands to Abdominal Pain. A. W. Allen and H. F. Howe, Boston.—p. 447.
Deep Cervical Abscess Simulating Ludwig's Angina. H. A. Goldberger, New York.—p. 463.
Mayo Vaginal Hysterectomy for Uterine Prolapse and Cystocele: Indications and Technic. V. S. Counseller, Rochester, Minn.—p. 467.

## Surgery, Gynecology and Obstetrics, Chicago

**63:** 689-806 (Dec.) 1936

Pathologic Yardstick: Its Accuracy as an Instrument for Measuring Errors in Clinical, Roentgenologic and Surgical Diagnosis of Gastric Lesions. L. G. Cole, New York.—p. 689.
Prevention of Postoperative Jejunal Ulcers by Diet and Fundusectomy: Experimental Study in Dogs. G. B. Fauley and A. C. Ivy, Chicago. —p. 717.
Endometrial Histology and Pathology as Revealed by Biopsy Method. R. E. Campbell, F. C. Lendrum and E. L. Sevringhaus, Madison, Wis.—p. 724.
"Acute" Subdural Hematoma and Acute Epidural Hemorrhage: Study of Seventy-Two Cases of Hematoma and Seventeen Cases of Hemorrhage. F. Kennedy and H. Wortis, New York.—p. 732.
*Effect of Drugs on Different Segments of Intestine of Man. J. S. Guthrie and J. A. Bargen, Rochester, Minn.—p. 743.
Gastro-Enterostomy: Detailed Description of One Surgical Procedure. F. Glenn, New York.—p. 751.
Care of Ruptured Appendix: Reduction of Mortality to Four Per Cent in Series of Fifty Cases. J. L. DeCourcy, Cincinnati.—p. 756.
Treatment of Fractures: Further Observations on Use of Splenic Extract. T. Wheeldon, Richmond, Va.—p. 761.
Elongation of Partially Cleft Palate. J. B. Brown, St. Louis.—p. 768.
*Localization and Extraction of Foreign Bodies with Aid of Colored Roentgen Opaque Oil. J. D. Ellis, Chicago.—p. 772.
*Transfer of Tumor Cells by Surgical Knife. O. Saphir, Chicago.— —p. 775.
Arthroplastic Operation for Congenital Dislocation of Hip: Two Stage Procedure. P. C. Colonna, New York.—p. 777.
Fractures of Os Calcis. M. S. Henderson, Rochester, Minn.—p. 782.
Bladder Complications of Carcinoma of Cervix. R. C. Graves, C. J. E. Kickham and I. T. Nathanson, Boston.—p. 785.
Roentgen Treatment of Tumors of the Brain or Spinal Cord in Operating Room by Direct Radiation Through Open Wound. C. A. Elsberg, L. M. Davidoff and C. G. Dyke, New York.—p. 794.

**Effect of Drugs on Different Segments of the Intestine.**—Of double strength solution of posterior pituitary, physostigmine, peristaltin and acetylcholine as stimulants of the tone and motility of the human intestine, Guthrie and Bargen found solution of posterior pituitary alone to be a marked stimulant of the human intestine. It is the only drug of the group that is likely to prove effective regularly as a therapeutic agent in augmenting the peristalsis of an atonic or paralyzed intestine. The effect on the intestine that was observed to follow every administration of solution of posterior pituitary was so constant that the authors feel justified in concluding that the drug (1) is a powerful stimulant of intestinal peristalsis, (2) is consistent and regular in its action, (3) acts with apparently equal strength on both the colon and the ileum, (4) increases the motility of the intestine without apparently exerting any effect on the tonus and (5) is rapid in its action. Following its administration, it acts within three to five minutes and its action extends, with gradually diminishing effect, for from three-fourths to one and one-half hours. Physostigmine and peristaltin were found to be inconstant and uncertain in their action. The peristaltic contractions which each of these drugs produced were relatively mild, less regular in their occurrence and totally lacking in propulsive force as compared with those that followed each injection of solution of posterior pituitary. Acetylcholine possesses little worth as a stimulant of the human intestine. On seven of the nine occasions on which the drug was employed in doses ranging from 100 to 400 mg., no evidence of any effect on the intestine was apparent. On the two occasions on which some increase in either the tone or the peristaltic activity of the colon and the ileum was observed to occur, the stimulative effect of the drug was relatively slight and insignificant, as well as transient in character.

**Localization and Extraction of Foreign Bodies.**—Ellis proposes a method of localization of foreign bodies that can be carried out in any hospital provided with x-ray equipment and an operating room. Suitable right angle wire screens can be made in a hardware store. The patient is placed on the operating table and fastened to prevent movement. The skin is sterilized and the sterile right angle screen is fastened to the part by a half hitch with tape or cord. A roentgenogram is taken of each side of the wire screen with the tube centered and the "normal ray" at right angles to the flat surface of the screen. The distance of the tube should be a meter or more, if this is practical. From these roentgenograms the surface localization can be determined accurately by counting off the interstices of the metal screen on the x-ray image and on the skin. The foreign body is outlined on the skin with a dye or metal points, which are left in place until the operative incision is made. The depth can be measured on the roentgenogram of the other surface of the screen. A fine needle of appropriate length, as measured on the metal screen, is introduced through the surface projection of the foreign body on one plane of the screen and at right angles to it. Thus the approach to the foreign body is easily made. A few drops of colored opaque oil are introduced at the site at which the foreign body is expected to be located. As the needle is withdrawn a fine trace of colored oil is left along the path by gentle pressure on the syringe. This may serve as a guide in the surgical approach to the deeply injected oil. Another set of roentgenograms is taken and the relation of the colored radiopaque oil to the foreign body can be determined. If the first attempt is not successful and the deposition of oil is not in close proximity to the foreign body, the operation can be postponed for a few days until the oil is dispersed and another attempt to obtain internal localization by means of the oil can be made. General anesthesia is preferred, as local anesthesia often distorts the topography of the part. Before the skin incision is made and as each fascial plane is approached, points on each side of the contemplated line of incision are seized with Allis forceps and lifted so that the pressure of the knife will not displace a movable body beneath. Wide exposure and a minimum of sponging is desirable. A single foreign body can be found in the colored oil. A collection of minute fragments or an encapsulated body can be removed by dissecting the colored mass entirely.

**Transfer of Tumor Cells by the Surgical Knife.**—Saphir examined the material that adheres to the blades of knives used for obtaining biopsies of tumors, particularly breast tumors. The knives with which various types of malignant tumors were incised were examined shortly after they had been used. Either direct smears were made from the respective blades or the blades were washed with a small quantity of saline solution and smears were made from this suspension. Invariably, smears made from the material on the knives used to cut through the tumors showed tumor cells. In some instances the tumor cells were so abundant that at low magnification their numbers were comparable to that of erythrocytes on a blood smear of average thickness. Also, smears that were made from material on the knives used for removal of the primary tumor for biopsy before the radical breast operation was performed showed tumor cells. It appears that every biopsy carries with it the danger of transferring, and possibly transplanting, tumor cells into healthy tissue.

## Tennessee State Medical Assn. Journal, Nashville

**29:** 417-456 (Nov.) 1936

Symptoms of Perforated Peptic Ulcer. E. D. Mitchell Jr., Memphis. —p. 417.
Cesarean Section. L. E. Burch, Nashville.—p. 421.
Pneumonia, with Especial Reference to Typing and Specific Therapy. W. R. Cate, Nashville.—p. 426.
Postgraduate Education in Tennessee: Plans for the Future. O. S. Warr, Memphis.—p. 432.
Urinary Antiseptics. G. R. Livermore, Memphis.—p. 437.

## FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

### Archives of Disease in Childhood, London

**11:** 233-274 (Oct.) 1936

*Banti's Syndrome in Childhood: Report of Four Cases. L. C. Martin. —p. 233.

Ossification of Carpus in Rickets, Congenital Syphilis and Cretinism. P. Macarthur.—p. 243.

*Blood Sugar in Convulsions of Infancy and Childhood. Margaret B. Maclean.—p. 247.

Further Observations on Acid Metabolism in Rheumatic Children. W. W. Payne.—p. 257.

Amyoplasia Congenita Associated with Mongolism. L. C. Cook.—p. 261.

**Banti's Syndrome in Childhood.**—Martin reports four cases showing Banti's syndrome, in three of which the Wassermann reaction was negative and the fragility of red cells, bleeding time and coagulation time were normal. The fourth case exhibited the clinical features of Banti's ascitic stage. The few small palpable glands alone were atypical; the cervical ones were attributed to carious teeth. The absence of a definite leukopenia at such an apparently late stage of Banti's disease in addition to the long history of jaundice was, however, a warning that the case was not entirely typical. The Wassermann reaction was a weak positive. Banti's disease is said to be rare in children. The diagnosis of Banti's disease is seldom made before one of the major symptoms, such as hematemesis or grave anemia, has occurred, although examination of a child with a vague epigastric pain or swelling of the abdomen may reveal an enlarged spleen and a palpable liver. All conditions associated with splenomegaly in childhood must be excluded, and it must be remembered that the hematopoietic system of a child is unstable and reacts violently to stimuli which would have little or no effect on an adult. The reaction may take the form of splenomegaly, hepatomegaly, enlargement of lymphatic glands and varying degrees of anemia—such as occurs typically in von Jaksch's syndrome in response to stimuli like iron deficiency, rickets and syphilis or other infections. The two most important conditions to be excluded before diagnosing Banti's disease are syphilis and acholuric jaundice. Syphilis may exactly simulate Banti's disease, as it did in the author's fourth case, and hepatomegaly may accompany splenomegaly in acholuric jaundice; hence the Wassermann reaction and fragility of red cells are essential investigations. Small doses of iron, as a therapeutic test, may help to exclude an iron deficiency anemia, but massive doses should not be given in view of Davidson's success in the treatment of Banti's disease by such doses of iron. The term Banti's disease should be confined to those cases showing splenomegaly and secondary anemia, with or without hemorrhages and hepatic cirrhosis, but in which no known etiologic factor is present. Similarly splenic anemia should be applied to cases showing Banti's syndrome when some vascular disorder or specific infection can be recognized during life. The finding of portal or splenic thrombophlebitis at necropsy in a case of Banti's disease should not nullify the diagnosis made during life, until further work has shown whether such vascular abnormality is a cause or sequel.

**The Blood Sugar in Convulsions in Childhood.**—In view of the confusion of opinion regarding the rôle of hypoglycemia in the etiology of convulsions in childhood, Maclean performed blood sugar estimations in fifty children admitted to the hospital because of convulsions and made an attempt to follow the changes occurring in the blood sugar level from the beginning of a convulsion until some hours after it had ceased. The blood sugar was estimated at frequent intervals, often hourly. High blood sugar values occurred most frequently in the first three hours after the convulsion and often persisted into the fourth to the twelfth hour. There are as a general rule two phases, a state of hyperglycemia followed by one of hypoglycemia. A blood sugar level of more than 180 mg. was taken as indicating hyperglycemia and one of less than 60 mg. as hypoglycemia. Except in cases of true hyperinsulinism it would appear that hypoglycemia plays no part in the causation of the convulsions of childhood and that the upset in carbohydrate metabolism is the result and not the cause of the convulsions.

### British Journal of Physical Medicine, London

**11:** 119-138 (Nov.) 1936

Equipment for Physical Medicine of a Medium-Sized Hospital. A. P. Cawadias.—p. 120.

Ray Therapy and a Sunless Summer. W. Beaumont.—p. 123.

Hydraulic Underwater Massage and Its Therapeutic Indications. F. Foeldes.—p. 125.

### British Journal of Surgery, Bristol

**24:** 205-420 (Oct.) 1936

Three Cases of Glomangioma or Angioneuromyoma (Painful Subcutaneous Tubercle). W. A. Mackey and A. C. Lendrum.—p. 208.

*The Problem of Anuria: Review of Recent Work on Renal Physiology: Reports of Two Cases. A. W. Cubitt.—p. 215.

Some Contributions to Causation, Pathology and Treatment of Duodenal Ulcer and Its Complications. T. H. Somervell and I. M. Orr.—p. 227.

Congenital Disk-Shaped Lateral Meniscus with Snapping Knee. D. S. Middleton.—p. 246.

Some Examples of Disease of Vertebral Column Found in Skeletons of Ancient Egypt: Contribution to Paleopathology. L. R. Shore. —p. 256.

*Multiple Arthritis in Presumably Tuberculous Subjects: Difficulties in Diagnosis and Treatment. D. H. Collins and C. Cameron.—p. 272.

Gravity Drainage of Pelvic Abscess. A. L. McGregor.—p. 292.

Myomas of Esophagus. J. D. Rose.—p. 297.

Traumatic Rupture of Urethra: Eight Personal Cases, with Review of 381 Recorded Ruptures. A. Simpson-Smith.—p. 309.

Hyperplastic Tuberculosis of Stomach Causing Hour-Glass Deformity, with Complete Squamous Metaplasia of Upper Loculus. G. W. Watson, E. R. Flint and M. J. Stewart.—p. 333.

Hallux Valgus: Comparison of Results of Two Operations. E. I. Lloyd. —p. 341.

Pseudotuberculoma Silicoticum. K. C. Eden and J. Herbert-Burns. —p. 346.

Embolectomy on Vessels of Extremities. E. Key.—p. 350.

Bilateral Lobectomy for Bronchiectasis. I. Lewis.—p. 362.

**The Problem of Anuria.**—Neither of the two cases reported by Cubitt can be certainly put in the class of reflex anuria, but they both present unusual features. In the first case the obstructed kidney showed a dense shadow in the roentgenogram, presumably because of its congestion. The contralateral kidney was probably functionless. The ureteral calculus which was subsequently passed did not show in the roentgenogram. The symptoms of anuria were early in their appearance. Restoration of the flow of urine, probably due to the passage into the bladder of the stone blocking the ureter of a solitary functional kidney, followed the administration of intravenous saline solution. In the second case complete anuria followed nephropexy; both kidneys had been proved previously to be functioning perfectly. The cause was probably partly obstructive and partly infective. The symptoms were unusually early and severe. Restoration of the flow of urine and relief of symptoms followed a combination of intravenous dextrose, spinal anesthetic and bilateral ureteral catheterization. Spinal anesthesia is worthy of trial in cases of reflex anuria. This applies whatever its etiology, since the afferent path at least must be a nervous one. The experimental work done by physiologists in the last few years dealing with the blood supply of the kidneys, its response to humoral and nervous influences and the effect on the secretion of urine of these changes in blood supply and of changes in the urine pressure has an important bearing on the problem of anuria. Winton's conception of intrarenal pressure in particular is full of possibilities and requires further work. The author's tentative explanation of reflex anuria embodies the following possible sequence of events: spasm of one ureter in response to impaction of a stone sets up afferent nervous impulses which, either by direct reflex action or by release of some endocrine substance, cause vascular changes in the other kidney, an alteration in capillary permeability and an exudation of fluid into the renal parenchyma; the raised intrarenal pressure obstructs the tubules and raises the urine pressure opposing filtration; at the same time it causes partial obstruction to the venous outflow so that the kidney is congested with blood. Contributory factors may be (1) lowering of general blood pressure and (2) abnormal leak of urine back through the tubules into the blood stream, as a result of increased urine pressure.

**Multiple Arthritis in Presumably Tuberculous Subjects.**—Collins and Cameron present twelve cases that include a variety of arthritic manifestations occurring in tuberculous subjects. Every investigation and observation that they have been able to make has led them to the conclusion that, with the exception of three, none of these patients suffered from a

true tuberculous arthritis. They cannot categorically deny the possible influence of associated visceral tuberculosis on the production and course of the joint disease, but they do not use the term "tuberculous rheumatism" because every case pursued a course consistent with nonspecific arthritis and immobilization treatment, adopted because the condition was suggestively tuberculous, proved to be a totally unsuitable procedure in each case. The cases have been utilized to illustrate the difficulties in the early diagnosis of tuberculous arthritis and to warn against the too ready acceptance of a tuberculous etiology in multiple arthritis occurring in presumably tuberculous subjects. The many factors that contribute to the confusion in diagnosis in the case of a multiple arthritis are (1) the insidious monarticular onset of some case of multiple nonspecific arthritis, (2) the coexistence in the patient of some visceral tuberculous lesion, which may or may not influence the course of a nontuberculous polyarthritis, (3) the possible occurrence of a single tuberculous joint superimposed on a nontuberculous multiple arthritis, (4) the occasional incidence of true tuberculous arthritis in two or more joints, (5) the comparative infrequency of nonspecific arthritis of the hip in patients under middle age and the tendency to suppose such a condition to be tuberculous, (6) modification of the course of nonspecific arthritis due to early immobilization and (7) the possibility that there exists an atypical tuberculous form of polyarthritis—tuberculous rheumatism. Expectant treatment should be adopted in all such cases. This should consist of maintenance of general hygiene and rest in bed without immobilization until unequivocal evidence of the tuberculous or nontuberculous nature of the joint disease appears or is obtained by examination of aspiration or biopsy material.

## British Medical Journal, London

**2**: 903-956 (Nov. 7) 1936

Vitamin B Complex. R. A. Peters.—p. 903.
Flatulence and Epigastric Discomfort. J. A. Ryle.—p. 906.
Tubercle Bacillus as Cause of Obscure Disease of the Eye. F. A. Williamson-Noble.—p. 907.
Agranulocytosis and Amidopyrine. S. C. Dyke.—p. 911.
*Alkali Poisoning: Danger in Treatment of Gastric Ulcer. C. L. Cope. —p. 914.
The Eynesbury Quadruplets: First Nine Months of Life. E. H. Harrisson.—p. 917.

**Alkali Poisoning.**—Cope calls attention to the occasional toxic effects of alkaline powders which, in various mixtures, are prescribed and sold as "stomach powders" for the relief of gastric ulcer and similar complaints. Some persons are abnormally sensitive to some constituent of the alkaline powders and chronic alkali poisoning may persist for several weeks without the nature of the condition being appreciated unless its possibility is borne in mind. The condition develops typically in sufferers from gastric ulcer or similar gastric disorders. During the early stages of the development of symptoms a marked deterioration in appetite is frequent, especially an antipathy to the taking of milk, associated with attacks of vomiting of moderate severity. The most typical symptoms are concerned essentially with a change in the character of the patient, including thoughtlessness, irritability, unreasonableness, melancholy and depression. These symptoms continue, as a rule, to increase in intensity until definite drowsiness appears. There may be complaint of vague headaches and of general muscle pains. Somnolence and drowsiness become an increasingly prominent feature, until finally the patient may even pass into coma. In acute cases the transition from apparent normality to definite drowsiness may take only a few days; in chronic cases the patient may remain for weeks in a state of depression and mental inefficiency without the appearance of any drowsiness. Soreness of the eyes is complained of, owing to a red and inflamed conjunctiva. The physical signs of alkali poisoning are scanty. The most important changes are to be found in the blood. There may be (1) a severe degree of nitrogen retention, (2) a definite uncompensated alkalosis and (3) hypercalcemia and hypermagnesemia. Since the characteristic symptoms of alkali poisoning are referable to change in the mental state, a previous knowledge of the patient and his character is of the greatest help in early diagnosis. Although alkali poisoning does not itself cause a rise of blood pressure, the presence of this or of other signs associated with chronic nephritis does not eliminate the diagnosis. The essential and often the only necessary point in treatment is to stop the administration of all alkalis. Citrate is to be classed as an alkali and should not be given in ulcer patients. Recovery involves the elimination of retained bicarbonate, the restoration of a normal blood reaction and the restoration of normal renal function with resultant elimination of retained products of nitrogen metabolism. It is possible that the hydrated magnesium silicate introduced recently will solve the problem of the treatment of gastric ulcer in persons who are sensitive to alkalis.

## East African Medical Journal, Nairobi

**13**: 197-228 (Oct.) 1936

Carotenemia in Europeans in the Tropics. J. H. Sequeira.—p. 198.
Place of Logic in Medical Education. L. J. A. Loewenthal.—p. 204.
Hematologic Observations on Natives of Uganda. R. S. F. Hennessey. —p. 210.
Notes on Two Years' Maternity Work Among South Kavirondo (Kenya) Natives (215 Cases). P. G. Preston.—p. 215.

## Irish Journal of Medical Science, Dublin

No. **130**: 613-660 (Oct.) 1936

*Simplified Method of Roentgen Examination of Gastro-Intestinal Tract. T. C. J. O'Connell.—p. 613.
Opium Addiction and Its Treatment. M. G. Kelly.—p. 627.
Dublin University Biological Association, 1801-1900. S. B. Sachs. —p. 637.
"Recessus Retromediastinalis": Case. S. Shea.—p. 647.
Intraduodenal Fold with Intraduodenal Diverticulum. S. Shea.—p. 649.
Influence of Carotid Sinus on Respiration. D. H. Smyth.—p. 652.

**Roentgen Examination of Gastro-Intestinal Tract.**—O'Connell suggests using a narrow diaphragm with the patient in the right anterior-oblique position; the patient is asked to swallow one mouthful of barium sulfate with tragacanth, the passage of the barium through the esophagus is observed, the tube and screen are shifted and the entrance of the barium into the stomach is observed. Its method of entry and its passage along the lesser curvature are watched closely. If the barium is slow in proceeding down the stomach, the patient is asked to take one or two deep breaths. He is then rotated to face the operator directly. The cardiac end of the stomach is observed closely, and attention is then directed to the pyloric end. General observations as to the presence of a large quantity of secretion, filling defect or ulcer niche are made. The patient is then advised to relax somewhat and to slacken his abdominal muscles, and with the gloved hand the whole mucous membrane of the stomach—except that of the cardiac end—is displayed on the screen. If a suspicious area is seen, the diaphragm is narrowed and a whole plate or 10 by 8 film is exposed. If the gastric mucous membrane relief is normal, the examination is continued without delay. For the examination of the duodenum, some of the original mouthful of barium is forced into the duodenal bulb. With the tips of the fingers the barium is massaged over the lining of the bulb, the patient being rotated into different positions to achieve this. These observations having been made under the screen, a 10 by 8 film of the stomach and duodenal region is exposed. The patient is then given four or five further mouthfuls of barium sulfate and instructed to swallow these immediately. The stomach is observed again to detect the presence or absence of peristalsis. One or two waves are watched until they reach the pylorus, and anomalies are observed. Barium is already filling the bulb or it may have to be forced into the latter under the pressure of the hand. If this method fails to fill the bulb, the patient finishes the half pint of barium. The bulb is again watched in its filling and emptying and any persistent change of shape is seen. Observation is taken in both oblique directions and two whole-plate films are exposed. The second and third stages can be seen easily during this examination of the bulb. Finally, the actual shape and position of the stomach are observed. The level of the lower pole is ascertained. The patient, still fasting except for the half pint of barium, returns in two hours and further screening is carried out to ascertain whether the stomach is empty or how much barium remains in it. The patient is then allowed to return to bed or go home and have a meal. He is asked to return next day, having had his breakfast. Under the screen the position and mobility of the cecum, which always contains barium, are noted. One notes

whether the appendix is to be seen or not. The position of the transverse colon is marked. No further observations as to abnormalities are made on the colon except in special cases. This terminates the examination. If special observations are to be made on the colon, they are carried out by means of the barium enema. Of 752 roentgen examinations of the gastro-intestinal tract carried out in St. Vincent's Hospital, the diagnosis was correct in all except four cases.

## Journal of Hygiene, London

**36**: 467-614 (Oct.) 1936

Plague Conditions in Urban Area of Kenya (Nairobi Township). J. I. Roberts.—p. 467.
Plague Conditions in Rural Endemic Area of Kenya (Keruguya District, Kikuyu Province). J. I. Roberts.—p. 485.
The Carriage of Plague. J. I. Roberts.—p. 504.
Simple Method for Preservation of Serums by Desiccation in the Frozen State Without Use of Refrigerants. R. I. N. Greaves and Muriel E. Adair.—p. 507.
Studies on Significance of Vi Antigen in Mechanism of Typhoid Infection in Mice. J. Ørskov and F. Kauffmann.—p. 514.
Salmonella Onderstepoort: New Type of Salmonella from Sheep. M. W. Henning.—p. 525.
Size of Virus of Rabies (Fixed Strain) by Ultrafiltration Analysis. I. A. Galloway and W. J. Elford.—p. 532.
Size of Virus of Aujeszky's Disease (Pseudorabies, Infectious Bulbar Paralysis, Mad Itch) by Ultrafiltration Analysis. W. J. Elford and I. A. Galloway.—p. 536.
Phthisis and Physical Measurements in Wales. W. J. Martin.—p. 540.
Pneumoconioses in South Wales. S. L. Cummins.—p. 547.
Sterilization of Antityphoid Vaccine. H. Schütze.—p. 559.
Distribution of Antibody to Crystalline Egg Albumin in Serum of Injected Rabbits. Muriel E. Adair and G. L. Taylor.—p. 564.
*Passive Anaphylaxis Following Immediate Injection of Antigen After Antiserum. H. R. Dean, R. Williamson and G. L. Taylor.—p. 570.
Late Deaths Occurring in Active Anaphylaxis. R. Williamson.—p. 588.
Experiments on Infectivity for Healthy Calves of Bovine Tubercle Bacilli Discharged in Dung on Pasture: Part I. From Tuberculous Calves Fed with Emulsions of Tubercle Bacilli 1934 to 1935. Part II. From Tuberculous Cows Passing Tubercle Bacilli in Their Dung 1935 to 1936. E. C. G. Maddock.—p. 594.
Effects of Partial Obstruction of Airways of Lungs and Influence of Sources of Heat. L. Hill.—p. 602.

**Passive Anaphylaxis Following Immediate Injection of Antigen After Antiserum.**—The experiments of Dean and his collaborators show that an intravenous injection of antigen immediately after an intravenous injection of antiserum in the guinea-pig had the following results: 1. When acute shock and death took place within five minutes, the signs and postmortem appearances were indistinguishable from acute anaphylactic shock as typically seen in the guinea-pig. Some control animals injected only with antiserum died in a way similar to those which received both antiserum and antigen. 2. When delayed shock and death occurred some hours later, the postmortem appearances were those of gastro-intestinal congestion and hemorrhage resembling the changes seen in dogs dying of anaphylactic shock. Such changes were never seen in the control animals. 3. Practically all the animals which recovered had symptoms of respiratory embarrassment immediately following the injections of antiserum and antigen and many had later symptoms of abdominal shock. The animals that were given an injection of antiserum had symptoms only rarely and never abdominal symptoms. It is necessary to test the antiserums used by control inoculation, since some antiserums are toxic. Passive anaphylaxis can be produced by the intravenous injection of antigen immediately following that of antiserum, but it is easier to produce it by allowing an interval between the two injections.

## Lancet, London

**2**: 1021-1078 (Oct. 31) 1936

Constructive Hygiene in Obstetrics. J. S. Fairbairn.—p. 1021.
*Observations on Mechanism of Rheumatic Fever. A. F. Coburn.—p. 1025.
Mortality and Later Results of Subtotal Gastrectomy. R. J. Still.—p. 1030.
Gastric Achlorhydria in Chronic and Subchronic Proliferative Arthritis. O. Moltke and A. S. Ohlsen.—p. 1034.

**Rheumatic Fever.**—Coburn points out that in most individuals hemolytic streptococcic pharyngitis is followed by uncomplicated recovery. However, a small minority develop rheumatic fever shortly after convalescence from this type of infection. The author attempts to interpret the relationship of the immune response to the development of the rheumatic process. The data consist of observations on the serologic events immediately following hemolytic streptococcic pharyngitis. Variations in the clinical character of the attack show a close parallel to the types of antistreptolysin curves developed. The immune responses of the rheumatic individual differ from the normal in that they are delayed. If this should prove to be true in the light of more extensive data on normal responses, it must be assumed that the rheumatic subject who develops an attack handles the products of the hemolytic streptococcus in a peculiar way. Such a concept harmonizes well with the prolonged antigenicity of this organism during rheumatic attacks as evidenced by the persistence of high antistreptolysin titer levels for months after infection. In addition to the apparent delay in the immune response of the rheumatic subject, there may also be a delay in the final elimination of hemolytic streptococcus products from the body. These observations suggest the hypothesis that the rheumatic state is characterized by an abnormal method of disposing of hemolytic streptococcus products. The mechanism whereby such an abnormal immune response may induce disease is unknown. Further information on the nature of this abnormality may make possible an experimental approach to the mechanism.

**2**: 1079-1134 (Nov. 7) 1936

Age Factor in Lobar Pneumonia. R. Coope, H. A. Osborn and F. Pygott.—p. 1079.
Mandelic Acid in Treatment of Urinary Infections. M. L. Rosenheim.—p. 1083.
*Mandelic Acid in Treatment of Pyelitis in Childhood. G. H. Newns and R. Wilson.—p. 1087.
Size of Heart in Asthma and Emphysema. E. L. Rubin.—p. 1089.
Treatment of Postdiphtheritic Respiratory Paralysis with the Bragg-Paul Pulsator. C. J. McSweeney.—p. 1093.
Anemia of Pernicious Type Complicated by Diabetes Mellitus and Terminating in Acute Myeloid Leukemia. C. Elman and S. Marshall.—p. 1094.

**Mandelic Acid in Treatment of Pyelitis in Childhood.**—Newns and Wilson used mandelic acid in the treatment of thirty-six cases of pyelitis in children less than 12 years of age. There were twenty-four cases of acute pyelitis, ten cases were chronic or relapsing and in two albuminuria and casts were present, owing probably to pyelonephritis. Ten of the children had been treated unsuccessfully with potassium citrate before the administration of mandelic acid. Mandelic acid with sodium bicarbonate was used in most of the cases and was given in doses of from 15 to 30 grains (1 to 2 Gm.) four times a day, according to the age of the child. In all but three patients the urine was rendered sterile, often within a week of the beginning of treatment. The unsuccessful cases included a Bacillus mucosus-capsulatus pyelitis and a Bacillus proteus-pyelitis complicating pink disease. Little difficulty was experienced in reducing the $p_H$ to the optimal level of 5.3. Side effects were noted in two cases: in one diarrhea developed, necessitating temporary cessation of treatment; the other child had some vomiting. No harmful effects on the kidneys were observed. So far, of the thirty-six patients treated, nine have had relapses; three of these have had a second course of treatment which has produced a sterile urine. Of the nine relapses three were in patients with abnormalities of the urinary tract and two in infections with an organism other than Bacillus coli. Such infections do not yield so readily to mandelic acid therapy. Four cases are thus left for which no reason for relapse can be given.

## Medical Journal of Australia, Sydney

**2**: 553-582 (Oct. 24) 1936

Rat-Bite Fever: Some Observations. E. H. Derrick and H. E. Brown.—p. 553.
Unusual Case of Poisoning, with Some Notes on Nonalkaloidal Organic Substances. F. W. Carter.—p. 558.
The Law and the Coroner. H. R. Clark.—p. 565.

**2**: 583-614 (Oct. 31) 1936

Observations on Hemiplegia. D. W. C. Jones.—p. 583.
Treatment of Tuberculosis of Bones and Joints. A. R. Hamilton.—p. 590.
Static Foot Trouble. E. B. M. Vance.—p. 593.
Indications for Thoracoplasty in Pulmonary Tuberculosis. H. Searby.—p. 596.
Symptoms Preceding Suicide. S. J. Minogue.—p. 598.

**2**: 615-660 (Nov. 7) 1936

Tropical Ulcer, with Especial Reference to Its Etiology. F. W. Clements.—p. 615.

## Nature, London

**138:** 815-856 (Nov. 14) 1936

*Sodium and Water Metabolism in Relation to Disturbances of Carbohydrate Metabolism After Adrenalectomy. F. Verzár and L. Laszt.—p. 844.

Biosynthesis of Ascorbic Acid. G. C. Guha and B. Ghosh.—p. 844.

**Disturbances of Carbohydrate Metabolism After Adrenalectomy.**—Verzár and Laszt have found that, in the absence of the adrenal cortex, acriflavine hydrochloride is not transformed to acriflavine phosphoric acid but that adrenalectomized animals can be kept alive with large quantities of the latter substance (vitamin $B_2$). Lack of adrenal cortex causes serious disturbances in intermediate metabolism of carbohydrates and fats, particularly in the absorption of these substances. The selective absorption of dextrose is inhibited after adrenalectomy, and this is due to the absence of the cortex, since it can be restored by administering adrenal cortex extract. In adrenalectomized rats, the ingestion of dextrose causes great losses (into the intestine) of sodium by diffusion and of water by osmosis. Therefore the adrenalectomized animals, in contrast to normal rats, develop intensive diarrhea after dextrose administration. This is also seen in normal animals after the administration of xylose, which is absorbed slowly, or after dextrose with iodoacetic acid poisoning, when the dextrose is also absorbed slowly. The inhibition of the selective absorption of dextrose in adrenalectomized animals leads secondarily to losses of sodium salts and water. Similar disturbances are possible in the intermediate metabolism of carbohydrates and fats. These secondary disturbances of loss of sodium and water may be the cause of death of adrenalectomized animals, which can be prevented by giving sodium salts. In several cases, rats adrenalectomized from eight to fifteen days before died in from three to five hours when 5 cc. of a 50 per cent solution of dextrose was fed by stomach tube. A second group of such rats survived when sodium chloride and carbonate were given simultaneously.

## Quarterly Journal of Medicine, Oxford

**5:** 445-538 (Oct.) 1936

Lung Volume and Respiratory Exchange After Pneumothorax. R. V. Christie and C. A. McIntosh.—p. 445.

Thyroid Disease and Blood Lipids. E. M. Boyd and W. F. Connell.—p. 455.

*Subarachnoid Hemorrhage Based on Observations of Eighty-One Cases. A. B. Taylor and A. G. W. Whitfield.—p. 461.

Congenital Porphyrinuria: Postscript. A. Garrod.—p. 473.

Gee-Thaysen Disease: Idiopathic Steatorrhea of Adults and Adolescents in Nontropical Countries. H. Moore, W. R. O'Farrell, J. A. Geraghty, J. M. Hayden and M. A. Moriarty.—p. 481.

Gaucher's Disease. T. F. Bloem, J. Groen and C. Postma.—p. 517.

**Subarachnoid Hemorrhage.**—Taylor and Whitfield base their study on eighty-one cases found by investigating the records of two general hospitals. Although subarachnoid hemorrhage is generally recognized as the commonest cerebral vascular accident of young persons, half of their cases occurred in patients more than 40 years of age. Fifty-one of the patients are dead and twenty-one were known to be alive in 1934, while nine could not be traced. Age did not appear to be a decisive factor in deciding the issue of death or recovery. The onset of symptoms ranges from sudden unconsciousness to mild headaches, while occasionally isolated neurologic signs without any generalized effects are the first indication of the condition. The classic onset with sudden unconsciousness was elicited in two thirds of the cases. On reaching the hospital forty-three of the patients were still unconscious, thirty-seven were conscious and one was dead. The mental state was abnormal, apart from unconsciousness, in eighteen patients, ranging from actual delirium to lesser degrees, such as incoherence, disorientation, irritability and confusion. Fits occurred in sixteen patients, usually either at the onset and did not recur, or associated with a terminal relapse as though there had been a further leakage of blood, which soon proved fatal. Signs of meningeal irritation are probably constant in subarachnoid hemorrhage when the leak is appreciable and sufficiently recent. Generalized rigidity with extension of the limbs was a characteristic feature in a number of cases. In many cases more particular neurologic signs were noted, which were sometimes of value in localizing the position of the aneurysm. Ocular palsies were frequent but of no localizing value. In cases in which a raised blood pressure was found, it was obviously due to a sudden increase in intracranial pressure, but in some patients, especially those in middle and later life, high blood pressure may have existed before the onset of subarachnoid hemorrhage and may, in association with arterial degeneration, have been a cause and not an effect of their ruptured blood vessel. The temperature was subnormal immediately following the hemorrhage in all cases (often 95 F.). If the patient lived as long as twenty-four hours after the onset of hemorrhage, some degree of pyrexia always occurred. Lumbar puncture is the most valuable diagnostic aid. The cerebrospinal fluid is intimately mixed with blood and, when the corpuscles are allowed to settle, the supernatant fluid remains yellow. The explanation of the rare cases of subarachnoid hemorrhage with clear fluid at lumbar puncture is that the puncture is done before the blood has had time to get down to the lumbar theca or that the sudden rush of blood from a ruptured aneurysm causes such a sudden increase of intracranial pressure that a pressure cone forms and prevents the blood from traveling down to the spinal theca. Apart from the increase in protein due to the presence of blood, the chemistry of the cerebrospinal fluid is usually unaltered, though sometimes the chlorides vary. Necropsies were performed on forty-three patients and a ruptured aneurysm was found in thirty-three on or close to the circle of Willis; in eight cases the source of the hemorrhage could not be localized and in two cases a vessel had ruptured but no evidence was found of an aneurysm. The prognosis is always serious—an immediate mortality of 63.4 per cent was found—and because of the antagonistic forces that result from the ruptured cerebral vessel treatment is necessarily restricted in its usefulness, but the judicious and cautious use of lumbar puncture is of the utmost value, and the partial replacement of the cerebrospinal fluid by air has been tried in these cases and is suggested as a helpful adjunct.

## Tubercle, London

**18:** 49-96 (Nov.) 1936

Climate and Its Relationship to Tuberculosis. L. Rogers.—p. 49.

Climate as an Auxiliary Factor in Treatment of Pulmonary Tuberculosis. G. B. Price and A. Sandison.—p. 59.

Use of Leica Camera in Making Records of Radiographs. F. Heaf.—p. 65.

Study of Hydrogen Ion Concentration of New Type of Acidoresistant Bacillus Parasitic to Guinea-Pig. R. K. Goyal.—p. 66.

Postmortem Bronchography: Anatomic and Clinical Studies. D. Salkin, A. V. Cadden and R. B. McIndoe.—p. 71.

## Journal of Oriental Med., Dairen, South Manchuria

**25:** 61-78 (Oct.) 1936

On Agricultural Products, Especially Alimentary Foodstuffs in Jehol. A. Abe.—p. 61.

Experimental Examination on Secretory Relations of Operated Stomach. T. Yoshitoshi.—p. 62.

Examination on Passage of Potassium Rhodanate in the Eye. Y. Kodama.—p. 64.

Influence of Various Incretory Glands on Rhodan Formation in the Organism: I. Influence of Thyroid. M. Hashimoto.—p. 65.

Experimental and Histologic Study of Influence of Sympathicoganglionectomy in Uppermost Thoracic Region on Lung: Second Report. S. Hayashi.—p. 66.

Influence of Experimental Nose-Dyspnea on Formation of Indican: Report Two. T. Hirai.—p. 67.

Supplement to Statistics of Tuberculosis of Japanese in Manchoukuo. S. Kawahito.—p. 68.

Sacrococcygeal Tumors in Chinese Children. M. Yuba.—p. 69.

Technologic Notes on Thermo-Esthesiometry. K. Ogata.—p. 70.

Relation Between Preservation of Diluted Tuberculin and Its Duration Titer. T. Hashimoto.—p. 71.

Disinfection of Drinking Water at Low Temperature: I. Germicidal Efficiency of Halogen Disinfectants and Preammoniation in Water Disinfection. W. T. Kuo.—p. 72.

Investigations of Biologic Character of Leishmania Donovani: II. Report: Resistance of Leishmania Donovani to Chemical and Physical Environment. Y. Saito.—p. 73.

Investigations into Amebic Dysentery: V. Cultivation of Endamoeba Histolytica: Part II. Determination of Bacteria Contained in Culture Mediums (Tamabe-Chiba's) and Examination of Influences of Bacteriophage and Some Pathogenic Intestinal Bacteria on Growth of Amebas. Y. Yamamoto.—p. 75.

Clinical Examination of Kaschin-Beck's Disease. K. Sannomiya, M. Osaki, K. Kubo, T. Matsuura, Y. Miki, M. Teranisi, T. Yamanaka, M. Tsuzawa, T. Togawa, F. Chang and Y. Wei.—p. 76.

Investigations into Amebic Dysentery: Observations of Biologic Character of Endamoeba Histolytica: Part II. Oxidation and Reduction of Endamoeba Histolytica. M. Yoseзato.—p. 78.

## Archives des Maladies de l'App. Digestif, Paris

**26:** 1001-1120 (Nov.) 1936

*Gastric Atrophy and Intermediate Malignant Anemia. R. Boulin, F. Moutier and R. Lehmann.—p. 1001.
Constant in Acidity of Gastric Juice. Léon-Meunier.—p. 1009.
Physiopathologic Study of Hematopoietic Place of Stomach. A. C. Guillaume.—p. 1015.
Modifications of Blood in Acute Parenchymatous Hepatitis. I. B. Schulutko, R. G. Berger and N. E. Bagryanskaya.—p. 1030.
Modern Treatment of Anal Fissure. E. Machline.—p. 1050.

**Gastric Atrophy and Intermediate Malignant Anemia.**—Boulin and his collaborators report a case of intermediate malignant anemia with gastric atrophy from the anatomopathologic point of view. The patient was a man, aged 82, who complained of continuous abdominal pain, affecting chiefly the right hypochondrium and the periumbilical region. The first date of appearance of these symptoms was almost thirty years prior to this hospital admission. For several months, however, the patient complained of generalized asthenia and loss of weight. The tongue showed the classic glossitis. There was tympany of the cecal region, but no abdominal tenderness. The achilles reflexes were abolished and the pulse was rapid but there were no other important physical signs. Test meals of the stomach revealed no free acidity. The blood showed megalocytic hyperchromic anemia, with 1,850,000 red cells and a hemoglobin of 45 per cent. In spite of the institution of liver therapy the patient died shortly from intercurrent infection. Examination of the organs of the body failed to reveal any abnormality other than that of the gastric mucosa, which was characterized by marked atrophy. The vascular network was visible because of the relative transparency of the mucosa. Microscopically the atrophy involved the submucosa and mucosa more than the muscular layer. The fundus glands were modified to resemble the pyloric glands. In places the mucosa was reduced to a band of sclerous tissue. Infiltration of lymphocytes and plasmocytes involved the muscular layers. It was almost impossible to find the nerve plexuses, since they were destroyed by sclerosis. These characteristics correspond to the description of simple atrophic gastritis, except for the vascular dilatations, which were similar to those observed in linitis. Furthermore, this anatomopathologic description accordingly reveals the endoscopic characteristics of atrophic gastritis, with a well developed atrophic process and an advanced vascular dilatation.

## Bull. et Mém. de la Soc. Méd. des Hôpitaux de Paris

**52:** 1389-1426 (Nov. 9) 1936. Partial Index

*Essential Erythremia Uninfluenced by Teleoroentgen Therapy, Rapidly Improved by Phenylhydrazine Hydrochloride. L. Béthoux and J. Marcoulidès.—p. 1390.
Humoral Factor in Measles Anergy. V. de Lavergne and H. Accoyer.—p. 1420.

**Erythremia Improved by Phenylhydrazine Hydrochloride.**—Béthoux and Marcoulidès report the case of a patient with essential erythremia, treated at first by teleoroentgen therapy, without apparent success. This was followed by treatment with phenylhydrazine, which led to rapid improvement from both the hematologic and the clinical standpoint. The dosage of phenylhydrazine hydrochloride was 0.05 Gm. for four days, 0.1 Gm. for four days and 0.15 Gm. for three days. This observation shows that, in spite of a total irradiation involving relatively strong doses, the erythrocytes remained at a relatively high level, and that from a clinical standpoint irradiation seemed even to be harmful to the patient. Headaches in particular seemed to be exaggerated. Furthermore, if the difficulty of application of teleoroentgen therapy is considered, the comparative simplicity of chemotherapy tends to lead primary choice toward the latter.

## Revue de la Tuberculose, Paris

**2:** 890-1024 (Oct.) 1936

Roentgenologic Study of Pulmonary Mechanism in Latero-Inclined Position. Lowys, Marinet and Marlin.—p. 890.
*Mechanism of In Vitro Leukocytic Reactions in Presence of Tuberculin. R. Kirsch.—p. 910.

**In Vitro Leukocytic Reactions to Tuberculin.**—Kirsch employs the following method for studying the reaction of leukocytes to tuberculin: The blood, after centrifugation and removal of the larger portion of the citrated plasma, is washed several times in physiologic solution of sodium chloride. The leukocytes remaining in contact with the red blood cells are placed in an incubator at 37 C. and incubated with the diluted old tuberculin of Koch and with fresh serum from the same individual. After incubation for twenty minutes or more the smears are fixed, stained and examined. The changes in the polymorphonuclear cells and large monocytes are noteworthy. Eosinophils and lymphocytes do not appear to be modified. The polymorphonuclear neutrophils usually show chromatic changes and vacuolization of the protoplasm. The large mononuclears are less affected but frequently show protoplasmic vacuolization. They agglutinate with each other and with the polymorphonuclear cells, and their borders become indistinct. When physiologic solution of sodium chloride is used instead of homologous serum, the changes in the leukocytes are minimal. In a number of other experiments the author used substances other than the serum of the individual whose blood was to be tested. Thus guinea-pig serum, calcium chloride and sodium citrate were employed in some tests. Glycerinated peptone bouillon, peptones and proteins of egg white were also used. The combined results of these experiments lead to the conclusion that tuberculin, concentrated glycerinated peptone bouillon, peptones and egg white proteins exert a rapid and intense toxic action on the washed leukocytes of allergic origin in the presence of fresh serum. These changes are observed in a distinctly modified fashion in the presence of heated serum. The polymorphonuclear neutrophils and the large monocytes fix the toxic elements of these solutions, even in the absence of serum, but they are not themselves changed except in the presence of fresh serum. Calcium chloride and sodium citrate prevent the action of fresh serum, probably by the inhibition of the complement of the serum. Finally, tuberculin and the peptones toxify fresh homologous or heterologous serum, and this toxicity does not disappear by heating at 57 C.

## Schweizerische medizinische Wochenschrift, Basel

**66:** 1245-1280 (Dec. 12) 1936. Partial Index

*Endocrine Treatment of Simmonds' Disease and of Related Asthenic Conditions. A. Schüpbach.—p. 1245.
Rheumatic Fever. L. Lichtwitz.—p. 1248.
Phenomena of "Refusal" of Calcium and of the Fixing Agents of Calcium in Experimental and Clinical Rickets. G. Mouriquand.—p. 1253.
Antibodies Protectors Against Several Micro-Organisms Sensitive to Beta Bacteriolysin. A. Pettersson.—p. 1255.
Significance of Antitoxin for Cure of Diphtheria. A. Hottinger.—p. 1256.
*Artificial Pneumothorax As Therapy in Genuine Pneumonia. L. P. Daniels.—p. 1260.
*Treatment of Pulmonary Abscesses with Alcohol Injections. E. Magnus-Alsleben, S. Durusoy and Ş. Atakam.—p. 1262.

**Hormone Treatment of Simmonds' Disease.**—Schüpbach points out that Simmonds' disease is now identified with prehypophyseal insufficiency, because the original term hypophyseal cachexia, is too restrictive. The abolishment of the prehypophyseal function may be caused by anatomic processes, such as tumors, inflammations, traumas and syphilitic lesions, but the disturbance may also be of a purely functional nature. This last group includes many of the milder forms, such as the exhaustive states in constitutional asthenia. In this connection the author mentions also the persons who are always weak and tired and who have low arterial pressure, a tendency to fainting, poor appetite, constipation and so on. The physical weakness is frequently accompanied by similar psychic reactions. In discussing the treatment of prehypophyseal insufficiency, the author gives his attention to cases in which a functional rather than an anatomic disorder of the prehypophysis is the cause. He emphasizes that, since the disorder is caused by an insufficiency of the entire prehypophysis and not merely by a deficiency of some of its numerous hormones, the treatment should employ those preparations which most nearly exert the effect of the entire prehypophysis. He reports the histories of several patients in whom he produced good results with a prehypophyseal extract. The first case concerns a woman, aged 38, who received three times daily two tablets of a prehypophyseal extract. This oral therapy was continued for a year. The patient gained 25 Kg. in weight and menstruation returned after

an interval of three years. In another patient, whose history is reported, the author administered the prehypophyseal extract subcutaneously as well as by mouth. Moreover, thyroid was given intermittently. The patient gained rapidly in weight, the menstrual flow returned and within a few weeks her general condition had changed completely. The author ascribes the more rapid improvement in this patient to the more intensive treatment. The administration of other than prehypophyseal extracts in hypophyseal insufficiency is indicated only in the extremely severe and prolonged cases of prehypophyseal insufficiency, in which thyroid, adrenals and gonads have become severely involved. Endocrine treatment by means of implantation of animal prehypophyses is indicated only if an activating effect is desired and if the oral or parenteral administration of an extract of the entire prehypophysis does not produce the desired effect.

**Artificial Pneumothorax in Pneumonia.**—Daniels observed a case of pneumonia in a boy, aged 16. An artificial pneumothorax was induced on the third day on account of severe pain. The author discusses pneumonia in general, emphasizing that the pneumothorax therapy exerts its influence only on the pains. He points out that under certain conditions this therapy might be harmful; for instance, in case of severe impairment of the myocardium or in case the other side becomes involved later. Moreover, the displacement of the mediastinum has to be watched for. The author thinks that in pneumonia artificial pneumothorax is justified only if severe pleural pains have to be relieved and even then only in exceptional cases. He does not think that this intervention promises more for the future.

**Alcohol Injections in Treatment of Pulmonary Abscesses.**—After reviewing the literature on this method of treatment, Magnus-Alsleben and his associates report six cases of pulmonary abscess in which they resorted to alcohol injections. A 33 per cent solution of alcohol in distilled water was administered intravenously in quantities of from 75 to 200 cc. at intervals of from four to five days. The total number of injections varied between four and seven. Five of the patients were cured. The authors gained the impression that the alcohol injections exerted a favorable influence on the clinical course, for the temperatures as well as the quantities of sputum decreased following the alcohol injections. In several of the cases a noticeable improvement concurred with the injections after other remedies had been employed for weeks without success.

## Ginecologia, Turin

**2:** 1023-1150 (Nov.) 1936. Partial Index

*Behavior of Curve of Alimentary Glycemia with Different Amounts of Sugar in Pregnancy. G. Addessi.—p. 1024.
Pathogenesis of Sudden Detachment of Normally Inserted Placenta: Rôle of Chronic Poisoning from Carbon Disulfide; Cases. M. Picardi.—p. 1039.
Structural Modifications of Uterine Veins in Relation to Age. E. Berutti.—p. 1087.
Structural Modifications of Ovarian Vessels in Relation to Age. E. Berutti.—p. 1109.
Value of Test of Drop of Dried Blood in Diagnosis of Syphilis in Obstetrics. G. V. Segre and R. Bolaffi.—p. 1129.

**Behavior of Curves of Alimentary Glycemia in Pregnancy.**—Addessi studied the behavior of the curve of glycemia in pregnancy after administration of different amounts of dextrose, according to Labbe, Bufano and Faber's tests. The glycemia of normal pregnant women with a fasting stomach is under normal figures or else there is hypoglycemia. The curves of induced hyperglycemia given by the different tests were in agreement. The author concludes that normal pregnancy does not modify the curves of induced hyperglycemia, which show the same characteristics that they have in conditions other than pregnancy. Only during the seventh and eighth months of pregnancy have the curves a slight and transient deviation toward a paradiabetic type, which is due to liver disturbances of fixation of dextrose and also to a lowering of the renal threshold of permeability to dextrose. The renal threshold is not so low as to result in the production of glycosuria, but the stimulation of induced hyperglycemia produces it. The author considers the seventh and eighth months of pregnancy a pathologic period during which the balance of the mechanism which regulates glycemia in pregnancy is transiently ruptured. By the ninth month of pregnancy the functions controlling glycemia are again normal.

## Minerva Medica, Turin

**2:** 517-536 (Dec. 1) 1936

*Action of Histamine on Tuberculous Foci of Lung: Roentgen Study. G. Luzzatto-Fegiz.—p. 524.
Relations Between Erythema Nodosum and Tuberculosis. E. Massobrio and U. Demichelis.—p. 529.

**Action of Histamine on Tuberculous Foci of Lung.**—Luzzatto-Fegiz reported in a previous article a harmless method for auscultation of foci of pulmonary tuberculosis which otherwise are silent. It consists in the administration of a subcutaneous injection of 1 cc. of a 1:1,000 histamine solution. The alterations of respiration, murmurs and râles that are characteristic signs heard by auscultation in pulmonary tuberculosis appear shortly after administration of the injection in four out of every five patients suffering from pulmonary tuberculosis. The injection fails to induce these signs in normal persons. The author made serial roentgenograms at intervals of a few minutes in order to study the anatomic and functional changes induced by the histamine injection in the tuberculous lung. The roentgenograms, compared with those taken in the same position immediately before administration of histamine, showed a clearer and more transparent pulmonary parenchyma around the tuberculous foci, darker tuberculous foci with more definite contours, darker images of the ulcerations of a bread crumb type, constriction of the lumen of the bronchi (except those which were rigid from a process of chronic peribronchitis) and darker and thicker shadows of the blood vessels, especially those near the hilus. If the parenchymal lesions were in an advanced stage, however, the shadows given by the tuberculous foci overshadowed those given by the vessels. According to the author the increased transparency of the lung parenchyma is due to emphysema from spasm of the bronchi. The clear parenchyma, as a field, produces by contrast a good showing of the shadows given by the pulmonary foci and blood vessels. The clear visualization of the ulcerations of the bread crumb types is due to spasm of the arterioles. The anatomic and functional changes induced by histamine in the tuberculous lung, as verified by the author, prove that the roentgen phenomena have as a common producing factor the bronchial spasm induced by histamine. His results prove also the exactness of his opinion as to the mechanism of production of the auscultatory signs by the histamine test. According to the author there is a condition of bronchial stenosis in pulmonary tuberculosis with consequent retention of air in the alveoli which results in the spontaneous production of murmurs and râles at the site of inflammation and edema at the tuberculous foci. When the bronchial spasm is latent, the murmurs and râles fail to be produced. Histamine, which cannot produce bronchial spasm in the normal respiratory tract, changes latent bronchial spasm into actual spasm with consequent development of murmurs and râles, which are audible at the tuberculous foci.

## Policlinico, Rome

**43:** 535-606 (Nov. 15) 1936. Surgical Section

Thyroid Toxic Adenoma and Exophthalmic Goiter: Subtotal Thyroidectomy. R. Broglio.—p. 535.
*Influence of Local Injections of Cholesterol on Healing of Fractures. A. Grassi.—p. 544.
"Mens Agitat Molem": Surgical Treatment of Gastric Ulcer of Nervous Origin. B. Schiassi.—p. 557.
Experimental Gastric Phlegmons. P. Stefanini.—p. 590.

**Influence of Cholesterol on Healing of Fractures.**—Grassi studied the evolution of experimental fractures in rabbits treated with injections of 0.5 or 1 cc. of a 2 per cent solution of cholesterol oil. The injections were given at the site of the fracture or intramuscularly every day for from ten to thirty days. The results were compared with those obtained in two groups of control rabbits: those which were given daily injections of 0.5 cc. of a physiologic solution at the site of the fracture, for the same length of time as those treated with cholesterol, and those which were not treated at all. The author found that cholesterol in local injections accelerates

fixation of calcium and formation of bone callus. The roentgen examination of the fracture shows a larger and thicker callus in rabbits treated with cholesterol injections than in the controls. The histologic examination of preparations of the fracture shows that the processes of proliferation, disappearance of cartilaginous tissues, transformation of osteoid tissue into bone and internal reconstruction of the medullary canal and of the diaphyseal cylinder are accelerated by cholesterol local treatment. The acceleration of the process of consolidation is more rapid and marked from the tenth to the twentieth day of the treatment than before and after those days. The results of the author's experiments confirm the relations between the local lipoid trophism and the fixation of calcium salts. The mechanism by which fixation of calcium salts and healing of the fracture take place is due to local and general modifications of the calcium metabolism by action of the local treatment, and also to local chemical combinations of calcium and phosphorus in presence of cholesterol at the site of the fracture.

## Semana Médica, Buenos Aires

**43:** 1465-1536 (Nov. 26) 1936. Partial Index

Benign Tumors of Breast in Men: Cases. A. Egües.—p. 1469.
*Hypernephroma of Grawitz's Type with Ganglionic Metastases. R. S. Aguirre and S. Nino.—p. 1472.
Roentgen Diagnosis of Chronic Appendicitis. E. Gambetta.—p. 1480.
Twisted Spermatic Cord and Hydatid of Morgagni: Cases in Children. M. L. Olascoaga.—p. 1484.
Papilloma of Female Genitalia: Treatment by Diathermocoagulation. A. A. Emanuel.—p. 1492.
Antidiphtheritic Vaccination by Nasal Route: Technic. A. Sabelli.—p. 1493.

**Hypernephroma with Ganglionic Metastases.**—Aguirre and Nino report a case of hypernephroma with generalized metastases of the ganglions in a patient, aged 32. The histologic study of a ganglion of the neck removed for biopsy showed hypernephroma metastasis and the x-ray study of the patient showed the presence of large metastases in the spleen and lungs. The kidneys were enlarged and ptotic. Renal function was normal. The authors conclude that hypernephroma of Grawitz type is frequent. The tumor evolutes for some years without any local or general symptoms. The metastases formed develop rapidly, reach a larger size than the original tumor and cause the predominant symptoms of the disease. The visceral and skeletal metastases, which are the earliest and most frequent, are formed through the blood. The malignant infiltration of the renal capsule, with consequent rupture of the structure and rapid destruction of the perirenal tissues, which takes place in the advanced stage of hypernephroma, results in spread of the tumor by contiguity into the neighboring organs, the juxtathoracic ganglions and the regional lymphatics. The development of metastases in the ganglions, especially the peripheral ones, indicates an advanced phase of hypernephroma. It coincides with cachexia. Both conditions are contraindications for any operation.

**43:** 1537-1608 (Dec. 3) 1936. Partial Index

Urobilinuria in Normal and Pathologic Conditions in Children. J. R. Díaz Nielsen.—p. 1559.
Eutrophic Action of Thyroglobulin. A. Buzzo, A. Agostini de Muñoz and G. Bayley Bustamante.—p. 1575.
Late Complications of Heine Cyclodialysis for Glaucoma. A. J. Manes.—p. 1581.
*Rare Localization of Neuro-Anemic Syndrome. J. F. Tourreilles and P. C. Vázquez.—p. 1583.
Treatment of Chancroid by Emetine Hydrochloride. C. Visconti.—p. 1595.

**Neuro-Anemic Syndrome of Unusual Localization.**—Tourreilles and Vázquez say that the neuro-anemic syndrome of pernicious anemia may involve the anterior, lateral and posterior gray columns of the spinal cord, either separately or simultaneously. When the syndrome develops in the posterior column, the lesions may involve the cervical or the lumbosacral segments of the spinal cord, causing nervous symptoms in the upper or lower extremities, or they may involve simultaneously different segments, causing symptoms in both the upper and the lower extremities. The diagnosis of the neuro-anemic syndrome is made by the coexistence of pernicious anemia and sensory and motor disturbances in persons in whom the Argyll Robertson pupil fails to appear. A differential diagnosis of the nervous symptoms is made with those of hereditary cerebellar ataxia, tabes, amyotrophic lateral sclerosis and nerve syphilis. In making a regional diagnosis the spinal, cerebral and polyneuritic localizations of the nervous lesions have to be considered. When pyramidal symptoms do not appear, it is difficult to differentiate the spinal and polyneuritic location of the nervous lesions. The authors' patient, aged 60, reported for the first time with a syndrome of pernicious anemia, which was controlled by liver treatment. She had three recurrences at intervals of about one year; they occurred whenever the patient stopped the liver treatment. Nervous symptoms at the shoulder and scapular region with consequent muscular atrophy of the arm complicated anemia. Nerve syphilis did not exist. Pyramidal symptoms failed to appear. A diagnosis of neuro-anemic syndrome with nervous lesions of the posterior column of the cervical region was made. It was based on the unilateral character of the nervous lesion and the results of the tests of the cerebrospinal fluid. The results of liver treatment in this case indicate a favorable reaction of those patients to the treatment. The fact calls for verification of statements previously reported in the literature on harmful results of the liver treatment in the neuro-anemic syndrome. The case described by the authors is the first one reported in the literature of neuro-anemic syndrome with lesions in the posterior columns of the cervical region.

## Klinische Wochenschrift, Berlin

**15:** 1705-1744 (Nov. 21) 1936. Partial Index

Correct Evaluation of Result Statistics. B. L. van der Waerden.—p. 1718.
Chemotherapy, Fluorescence and Cancer. M. Oesterlin.—p. 1719.
Antithyroid Action of Some Unsaturated Fatty Acids. H. Zain.—p. 1722.
Spinal Parasympathetic Innervation of Bronchial Musculature. S. Sato.—p. 1723.
Erythrocyte Sedimentation Speed and Allergy. W. Eickhoff.—p. 1724.
*Treatment of Splenomegalic Conditions. P. Riolo.—p. 1726.
*Improved Method of Histidine Reaction for Chemical Pregnancy Diagnosis. Regine Kapeller-Adler.—p. 1728.

**Treatment of Splenomegalic Conditions.**—Riolo followed the suggestion of Ascoli and Diliberto and treated malarial splenomegalies by means of intravenous injections of epinephrine, because the subcutaneous injections did not produce the desired results. He begins with 0.01 mg. (in 1 cc. of sterile water) and increases this dose gradually up to 0.05 or 0.1 mg., depending on the tolerance of the individual patient. The final dose is repeated twenty times until the splenic tumor disappears or is no longer influenced by further injections. Aside from reducing or counteracting the splenic tumor, the intravenous injections of epinephrine also counteract the dyspeptic disturbances that usually accompany the splenic enlargement and the splenitic and perisplenitic pains of patients with chronic malaria. The epinephrine treatment often results in a reactivation of the malarial infection; however, this does not impair the patient's general condition but only makes an adjuvant quinine cure advisable. Especially noteworthy is the improvement in the blood picture; namely, a considerable increase in the number of erythrocytes. Thus the epinephrine injections are also an effective treatment of the malarial anemia. The intravenous administration of epinephrine is indicated not only in malarial splenomegaly but also in the hemolytic and thrombopenic forms of splenomegaly.

**Histidine Reaction for Chemical Diagnosis of Pregnancy.**—Kapeller-Adler cites the authors who employed her histidine reaction for the diagnosis of pregnancy and shows why some of them obtained unsatisfactory results. To be sure, Stern discovered a source of error in the method. He showed that urines of patients with pregnancy pyelitis which gave a positive Griess reaction for nitrites usually had negative histidine reactions. In order to eliminate the shortcomings of the histidine reaction, Kapeller-Adler made further experiments. She found that urines containing nitrites and histidine will give a positive histidine reaction provided the urine is first treated with tenth-normal potassium permanganate in sulfuric acid solution, which oxidizes the interfering nitrites. She then gives

detailed descriptions of two technics, the first to be used for urines that give a positive Griess reaction and the second for urines with a negative Griess reaction. In the conclusion she emphasizes that in order to obtain satisfactory results it is necessary to follow the directions exactly. With her improved technic she was able to reduce the erroneous reactions to less than 4 per cent.

**15:** 1745-1784 (Nov. 28) 1936. Partial Index

Significance of Examination of Eye for Understanding of Hyper-Tensive and Renal Disturbances. F. Volhard.—p. 1745.
*Demonstration of Hormone of Posterior Lobe of Hypophysis in Blood with Aid of Ultrafiltration Methods. K. J. Anselmino and F. Hoffmann.—p. 1750.
Results of Bacterial Surface Culture Under Exclusion of Air With and Without Artificial Oxygen Consumption. W. Bachmann.—p. 1751.
*Results of Twenty-Four Hypophyseal Transplantations. E. Kylin.—p. 1756.
Pathogenesis and Spreading of Septic Puerperal Infections. K. Sommer.—p. 1760.
Endometriosis in Musculature of Arm. E. Navratil and A. Kramer.—p. 1765.

**Demonstration of Active Principle by Ultrafiltration Methods.**—Anselmino and Hoffmann point out that in 1931 they demonstrated, with the aid of an ultrafiltration method, an antidiuretic and a vasopressor substance in the blood of patients with eclampsia or with nephropathy and proved that this antidiuretic substance is identical with the antidiuretic component of the posterior lobe of the hypophysis. Since the effects of these substances corresponded to the clinical symptoms of the pregnancy toxicoses, they ascribed the latter to an incretory disturbance in which a pathologically increased formation of the active principle of the posterior hypophysis played the most important part. Their observations were reinvestigated by others, some of whom obtained contradictory results, in that they were unable to identify the antidiuretic substances in the blood of eclamptic patients with the antidiuretic component of the posterior lobe of the hypophysis. The authors show that this inability of the other investigators to identify the two substances is due to the fact that they employed a different ultrafiltration method. Instead of using the glacial acetic acid collodion membrane employed by the authors, they used an alcohol-ether-collodion membrane of several layers, which was put through a drying process. The authors state that the drying process makes the membrane impermeable for the principle of the posterior lobe of the hypophysis. They further describe their own technic and then report experiments. In one group of experiments they extracted the posterior pituitary principle that had been added to serums in vitro and in a second group they extracted posterior pituitary principle from the blood of dogs that had been given injections of the extract.

**Results of Transplantation of Hypophyseal Tissue.**—Kylin was induced to try the transplantation of hypophyseal tissues from calves to patients with hypophyseal cachexia (Simmonds' disease) by von Bergmann's report on three cases. Kylin employed the method in twenty-four patients, twenty-three of whom had Simmonds' disease. Twelve of these were completely cured and six were greatly improved, but since the elapsed time is still rather short a final evaluation is impossible as yet. Two patients died; one immediately after the operation and the other three months later. In three others the operation is of recent date. The first signs of improvement were usually observed after one or two months, but the increase in weight usually did not start until two or three months had elapsed. The hypophyseal transplantation proved valuable also in a youth, aged 19, who had adipogenital dystrophy.

## Medizinische Welt, Berlin

**10:** 1717-1756 (Nov. 28) 1936. Partial Index

Epidemiology and Prophylaxis of Influenza. P. Schmidt.—p. 1717.
Development of Bronchitis to Its Terminal Stages. K. Gutzeit.—p. 1719.
So-Called Chronic Tonsillitis. O. Vose.—p. 1724.
*Observations on Mild Attacks of Influenza During Puerperium. E. Schneider.—p. 1728.

**Mild Attacks of Influenza During Puerperium.**—Schneider states that the thirty-seven cases of influenza he observed among 1,472 puerperal women were mild and that the recovery was more rapid than is ordinarily the case in influenza. The unusually short duration of the influenza even in patients with rather high fever, severe impairment of the general condition, reddishness and painfulness of the pharynx and conjunctivae and painful cough is ascribed by the author to the fact that treatment was begun immediately after the first signs of influenza became noticeable. The women were kept in bed. They were given large doses of salicylate and usually also aminopyrine. In a few instances cardiac remedies were given. The cough was relieved with codeine syrup, and generous amounts of fluid were given. The lactation process was not impaired and the women continued to nurse their infants. However, in order to protect the infants against infection by droplets a cloth was placed around the woman's mouth and nose during nursing. In discussing the differential diagnosis of influenza during the puerperium the author says that, if the genitalia are free from changes, if there are no signs of cystitis, pyelitis, typhoid, articular rheumatism or recurrent tuberculosis and if the pharynx is hyperemic but without signs of angina, influenza may be considered a possible cause of the febrile temperature, the dryness of the oral and pharyngeal mucous membranes, the involvement of the conjunctivae and the general indisposition.

## Strahlentherapie, Berlin

**57:** 393-552 (Nov. 14) 1936. Partial Index

Are Surgical Results in Carcinoma of Uterine Cervix Improved by After-Irradiation? H. R. Schinz.—p. 393.
Practical Experiences on Reliability of Indirect Dosimetry. H. Holthusen.—p. 459.
*Wavelike Course of Radium Erythema as Well as Paradoxical Pallor Reaction to Radium on Comb and Wattles of Cock Resulting from Collagen Changes. E. Zurhelle.—p. 473.
Ray Sensitivity of Skin, Morphologic Constitution and Neurosympathetic Tonus. D. Bolsi and E. Conte.—p. 488.
*Technic of Treatment with Borderline Rays in Naevus Flammeus. F. Kalz.—p. 510.
Ray Action on Sympathetic Nervous System. W. Knierer.—p. 516.
*Influence of Roentgen Rays on Cholesterol Content of Blood and Serum of Women Without and With Carcinoma or Sarcoma. P. H. Schumacher and Rusch.—p. 532.

**Course of Radium Erythema.**—Zurhelle studied the reactivity of the skin to radium rays in experiments on himself. He applied the radium rays to several areas on his left arm by means of 10 mg. of radium element, which was filtered with 0.5 mm. of brass. The irradiation usually lasted about four hours. Several hours after the irradiation a follicular erythema appeared. However, this early erythema disappeared in from three to four days. Then followed a period of latency. After five weeks a rather severe erythema with swelling developed, which was preceded by a speckled reddishness. About six weeks after the radium irradiation a blister developed on the erythema, which burst about a week later. After that the inflammation subsided rapidly, forming a yellowish brown adherent crust. Later the crust came off and a slightly depressed scale-covered area remained, the depression still being noticable after a year. The course of the reaction was the same in eight different tests, which the author made on himself. In order to be able to make histologic studies, he decided to make animal experiments. He applied radium rays to the comb and wattles of cocks. Contrary to expectation he found that these organs react to radium rays with pallor. The histologic explanation of the pallor lies in a thickening or swelling of the collagen with constriction of the vessels, and the blister formation is due to a blister-like detachment of necrotic epidermis without exudation. He emphasizes that the highly vascular comb and wattles are especially suitable for disclosing changes in the collagen, because of the loose structure of the connective tissue. It was found that the connective tissue is involved in the reaction to irradiation by way of colloidal chemistry rather than through the action of the cells. Thus the author's investigations corroborate the observations of other investigators on the radiosensitivity of the collagenic fiber and indicate that in irradiation the chemical changes in the intercellular substance are more important than cellular changes.

**Borderline Rays in Treatment of Naevus Flammeus.**—Kalz states that he employed borderline rays in the treatment of forty-nine cases of a naevus flammeus. He usually applied

single doses of from 800 to 1,100 roentgens and total doses of from 10,000 to 12,000 roentgens. He emphasizes, however, that the aforementioned doses cannot be applied schematically in all cases but must be varied according to the localization of the nevus, the ray sensitivity of the skin (estimated on the basis of the intensity of the reaction), the size of the nevus, the age of the patient and the depth or superficiality of the nevus. After discussing and illustrating the adjustments in technic and dosage that may become necessary, he cites the results obtained at his clinic. He concludes that, if properly applied, the borderline rays are at present the best therapeutic method for naevus flammeus.

**Roentgen Rays and Cholesterol Content of Blood.**—Schumacher and Rusch made tests on the blood and serum of forty women, twenty-five of whom had carcinoma or sarcoma and fifteen of whom were definitely free from carcinoma. These tests did not corroborate the results of Levy-Dorn and Burgheim. The authors failed to detect fluctuations in the cholesterol content of the blood after roentgen irradiation. Moreover, they found no connection between cholesterol content and roentgen intoxication and no difference in the behavior of the blood of patients with or without cancer.

## Zeitschrift f. Hygiene und Infektionskr., Berlin

**119:** 1-134 (Nov. 14) 1936. Partial Index

Quantitative Evaluation of Filtrable Types of Virus. R. Doerr and S. Seidenberg.—p. 1.
*Nephelometric Determination of Watering of Milk. K. N. Kyriazidis.—p. 10.
Usefulness of Phenol in Producing Sterile Smallpox Vaccine. W. Lehmann.—p. 21.
Clinical Aspects and Bacteriology of Paratyphoid B. M. Tesdal.—p. 28.
Pathogenic Significance of Types of Pneumococci. H. Grossmann.—p. 38.
*Diphasic Nature of Typhoid Bacilli. F. Kauffmann.—p. 103.

**Nephelometric Determination of Watering of Milk.**—Kyriazidis shows that the fat content of milk is the essential factor in its turbidity. The various protein substances (casein, lactoglobulin and lactalbumin) are a much weaker turbidity factor and are subject to only minor changes. It has been proved that the fat content makes up about three fourths of the turbidity and the other substances only about one fourth. Because of this predominance of the influence of fat, the reduced permeability of a watered milk does not exceed that of a milk with a reduced fat content. However, if the fat is eliminated, the turbidity of the defatted milk is influenced by watering to a much greater extent. For this reason the author tested the constancy of the nephelometric values of defatted milk and determined its modification by watering. He fills a centrifuge tube of 30 cc. capacity to four fifths of its volume. Then this tube is closed with a rubber stopper, through which two hollow needles pass, one reaching approximately the lower third of the tube and the other slightly below the fat layer that is formed by centrifugation. Centrifugation is continued for fifteen minutes at 3,000 revolutions per minute. After this, from 4 to 5 cc. of milk is slowly withdrawn through the longer needle. The defatted milk thus obtained is diluted at 15 C. in a ratio of 1 : 10. Then it is placed into a glass cuvette (1 : 5 : 5) and its permeability is determined by means of Moll's extinctiometer. The amount of water is determined with the aid of a curve. Finally the detected quantity of water is calculated for one liter. In this calculation the quantity of fat must of course be taken into account. The author stresses that this method of nephelometric control of the watering of milk is superior to the chemical methods that are usually employed. It is not only simple and quick but also more exact than the chemical methods.

**Diphasic Nature of Typhoid Bacilli.**—Kauffmann directs attention to the fact that the serologic Salmonella types, in consideration of their flagellata antigen (H-antigen) have been divided into two groups: (1) the monophasic types, that is, the types that are present in only one phase, and (2) the diphasic types, which occur in two phases and represent two different serologic manifestations of one and the same type. The typhoid bacilli have heretofore been regarded as monophasic, because only one phase with a single H-antigen could be demonstrated. The paratyphoid B bacilli, however, proved diphasic. Since Japanese investigators had observed a change in phases in typhoid bacilli, the author made additional studies. He found that there is a second phase of typhoid bacilli, which is characterized by a specific flagellata antigen. This new flagellata antigen could be demonstrated only in typhoid bacilli and not in other Salmonella types. The author emphasizes that he uses the term phase only for two different serologic manifestations of the flagellata antigens, whereas he applies to the different serologic manifestations of the body antigens the term forms.

## Wiener klinische Wochenschrift, Vienna

**49:** 1481-1512 (Dec. 4) 1936

*Treatment of Hematemesis and Melena with Unrestricted Diet. E. Meulengracht.—p. 1481.
Positional Changes of Head and Upper Part of Trunk Elicited by Vestibule. R. Leidler.—p. 1485.
Relations Between Thyroid Hormone and Vitamin A. W. Fleischmann and Susanne Kann.—p. 1488.
Voluntary Apnea in Inspiration and Expiration as Individual Capacity Test. O. Eisenschimmel-Eisen.—p. 1489.
Behavior of Radiation Capacity of Blood and of Blood-Forming Tissues in Some Blood Diseases. E. Storti and P. de Filippi.—p. 1494.
Calculus Formation in Spleen After Malaria as Cause of Disorder. R. Meyer.—p. 1496.

**Treatment of Hematemesis and Melena with Diet.**—Meulengracht says that five years ago he decided to change the customary treatment of bleeding gastric ulcers from a greatly restricted to a practically unrestricted diet. The reasons which induced him to change the former treatment were that patients died of exhaustion after hemorrhages in spite or perhaps as the result of scrupulous dieting, that occasionally patients with protracted hemorrhage stopped bleeding when they were given food, and that ambulatory patients with severe melena frequently recovered without changing their diet. Moreover, it seemed to him inadvisable to let a patient starve at a time when, as the result of the shock of hemorrhage, the intake of fluids, salts, vitamins and sufficient calories seemed especially necessary. The diet recommended by the author is a so-called full purée diet. The patients are given five meals a day and are permitted to eat as much as they want. Foods are selected that will not cause irritation and are readily digestible. The noon meal includes a variety of dishes; namely, soups, meats, vegetables and fruits. The other meals consist of bread and butter, gruels, milk and so on. Milk is given also between the meals. The daily number of calories averages about 2,300. Three times daily the patients are given a teaspoonful of a mixture of 15 Gm. of sodium bicarbonate, 15 Gm. of magnesium subcarbonate and 2 Gm. of extract of hyoscyamus; a tablet of iron lactate is also given three times each day. With this method of treatment the author had only three fatalities in 273 cases of massive hemorrhages from gastric ulcers or erosions. In comparison with other statistics, which report a mortality of from 7 to 10 per cent, the mortality rate of his material is unusually low. After discussing the advantages of his treatment and the blood regeneration, he points out that, if with his method of treatment the mortality of bleeding gastric ulcers can be reduced to about 1 per cent, a surgical intervention will hardly be necessary during the hemorrhagic stage. To be sure, an operation for the gastric ulcer may become necessary at a later date.

## Sovetskaya Khirurgiya, Moscow

Pp. 171-368 (No. 8) 1936. Partial Index

Continuous Drip Blood Transfusion. P. G. Sakayan.—p. 184.
Early Treatment of Fresh Burns of Esophagus. I. V. Danilov.—p. 190.
Surgical Treatment of Acute Hemorrhage from Gastric Ulcer. I. M. Perelman.—p. 209.
Operative Treatment of Gastroduodenal Ulcer. V. N. Promptova.—p. 219.
*Acute Appendicitis Past Middle Age. N. T. Bondarenko.—p. 267.
*Surgery of Cancer of Colon. O. G. Turovets.—p. 289.

**Acute Appendicitis Past Middle Age.**—According to Bondarenko, 2,888 cases of acute appendicitis were admitted to the third surgical clinic of the Second Leningrad Medical Institute between 1919 and 1934. Of the patients 410, or 14.2 per cent, were past 40 years of age. An analysis of the incidence and of the clinical course of this group shows that acute appendicitis is almost as frequent in this age as in the younger

persons. The onset of the disease exhibits less pronounced pain, and temperature reaction, nausea and vomiting are noted less frequently, the typical local tenderness at McBurney's point may be absent and the tenderness frequently extends beyond the right lower abdominal quadrant. Atypical complaints and historical data further obscure the picture. The leukocyte count is relatively lower than anticipated and occasionally leukopenia may exist. The pathologic alterations in the appendix are more pronounced and the percentage of perforations is high. The course of the disease is characterized by grave complications and a high mortality rate. There is a frequent lack of relationship between the clinical symptoms and the pathologic observations. Profound pathologic alterations may exist in patients with trivial complaints and apparently insignificant objective signs. The high mortality index in the old depends principally on the rapid development of pathologic alterations. On the other hand, patients operated on early give a mortality rate not much higher than that of the younger groups.

**Surgery of Cancer of the Colon.**—Turovets considers the early diagnosis of cancer and its precancerous stage the most important factor in the treatment of colonic cancer. Early diagnosis will be possible only when the practicing physician will resort to clinical, laboratory and roentgenologic methods of examination. The early diagnosis of malignant neoplasm of the large intestine is made difficult by the fact that not infrequently it may run an asymptomatic course. The so-called general abdominal complaints of the middle aged may be its first symptoms and therefore call for a careful examination, including roentgenography. In cases difficult to diagnose, exploratory laparotomy is indicated. The author includes regional chronic colitis among the inflammatory and degenerative processes that may serve as a soil for the development of cancer of the colon. Polyposis, itself the result of various inflammatory processes, merits particular attention as a precancerous condition. The author stresses early operation and the widening of indications for a one-stage resection even in the presence of acute obstruction. Early resection gives a high percentage of permanent recoveries.

## Nederlandsch Tijdschrift voor Geneeskunde, Haarlem

**80:** 5537-5624 (Dec. 12) 1936. Partial Index

Importance of Quantitative Determination of Vitamins in Blood and Body Fluids for Estimation of State of Nutrition. L. K. Wolff.—p. 5542.
Hereditary Cleidocranial Dysostosis. J. C. J. Burkens, E. H. La Chapelle and J. Groen.—p. 5547.
*Circumscribed Cranial Osteoporosis (Schüller) with Psychosis. C. van der Heide.—p. 5555.

**Circumscribed Cranial Osteoporosis with Psychosis.**—Van der Heide relates the clinical history of a woman, aged 48, who was hospitalized on account of a paranoid-hallucinatory condition. Because it seemed probable that the psychosis developed on an organic basis, a roentgenogram of the skull was made and revealed pathologic changes in the bones finally identified as circumscribed cranial osteoporosis, which was first described by Schüller. The other portions of the skeleton were normal except for an irregular and rather coarse structure of the bone in the right ilium, which suggested Paget's disease. An exploratory excision from the temporal bone revealed almost normal bone. Following a review of the literature on circumscribed cranial osteoporosis, the author discusses the differential diagnosis with regard to Schüller-Christian's disease and to osteitis fibrosa cystica generalisata (von Recklinghausen). Finally he cites factors indicating a connection between circumscribed cranial osteoporosis and Paget's disease.

## Finska Läkaresällskapets Handlingar, Helsingfors

**79:** 839-931 (Oct.) 1936

Experiences with Finland's Red Cross Ambulance in Abyssinia. R. Faltin.—p. 848.
*So-Called Myeloid Reaction. G. Tötterman.—p. 880.
*Changes in Central Nervous System in Leukosis. R. Gordin.—p. 889.

**So-Called Myeloid Reaction.**—Tötterman's first case of so-called myeloid reaction occurred in a woman, aged 40, in connection with a subchronic polyarthritis. The highest number of white blood corpuscles was 21,200, with more than 40 per cent neutrophil myelocytes and metamyelocytes; normoblasts were abundant. The results of a sternal puncture testified definitely against leukemia. During almost two years' observation, no aggravation in the patient's condition has appeared. In the second instance, a man aged 31, with bothriocephalus anemia, there was a large number of immature leukocytes in the blood after pneumonia, with a total of 28,400 white blood corpuscles and more than 40 per cent myelocytes and metamyelocytes. After treatment of the bothriocephalus anemia the blood picture rapidly became normal.

**Changes in Central Nervous System in Leukosis.**—Gordin says that these changes in leukosis may depend (1) on hemorrhages in connection with the hemorrhagic diathesis, (2) on leukemic changes in the blood vessels and (3) on infiltration with specific leukemic tissue. The last named changes occurred mainly in acute leukoses (including chloroleukemia) and especially in lymphadenoses. Specific leukemic changes in the meninges and the nerves of the brain or the spinal roots are not uncommon. The most frequent disturbance of the spinal cord is a compression syndrome, caused by epidural leukemic tumor masses. In a patient presenting symptoms of acute ascending myelitis, leading in the course of two months to tetraplegia, paralysis of respiration and death, the lymph nodes were slightly enlarged and there were tumor-like nodules in the skin; a hemorrhagic diathesis and specific changes in the blood picture were absent. The epidural tumor of the spinal cord revealed at necropsy was made up of lymphoid tissue with lymphoblast and lymphocyte-like cells, also fibrocytes and macrophages. Similar tissue was found in the kidneys, in the lymph nodes and cutaneous tumors as well as in the stomach, where ulcerations surrounded by lymphoid tissue had developed. In the upper dorsal region the spinal tumor had caused myelomalacia. Hydromyelocele was also seen, with fenestration and degeneration of strands and acute changes in the ganglion cells. The author concludes that the tumors in the different organs were coordinated in their origin and of benign type, and he considers the case one of atypical leukosis, most nearly resembling a lymphadenosis. In a second case described there were simultaneous leukosis and a malignant brain tumor (glioma of spongioblastoma type).

## Hospitalstidende, Copenhagen

**79:** 1177-1204 (Nov. 10) 1936

*Prognostic Significance of Preoperative Electrocardiography and Roentgen Examination of Heart. J. Foged and T. Geill.—p. 1177.

**79:** 1205-1232 (Nov. 17) 1936

*Prognostic Significance of Preoperative Electrocardiography and Roentgen Examination of Heart: C'cn. J. Foged and T. Geill.—p. 1205.
Tuberculosis of Bronchial Lymph Nodes in Adults. A. Rottensten.—p. 1218.
Investigations on Content of Aminolipoid (Cephalin) in Plasma in Psychoses. L. Laursen.—p. 1227.

**Preoperative Electrocardiography and Roentgen Examination of Heart.**—Foged and Geill made electrocardiographic and roentgen examinations of the heart in 428 cases in which an important surgical intervention was indicated. In 253 of the 353 patients operated on in whom clinical examination failed to reveal any pathologic changes in the heart, the results of electrocardiography and roentgen examination agreed with the clinical results; the operative mortality due to heart weakness was 1.1 per cent. In the remaining 100, in whom electrocardiogram or roentgenogram, or both, disclosed abnormality in the heart, the operative mortality from impairment of the heart was 11.8 per cent. It seems to the authors justifiable to accept the outcome of these examinations as a factor in considering the operative risk, when the indication is not imperative. In certain cases the result of the examinations contraindicates the operation; in others it helps to decide the extent of the intervention. Myocardial degeneration and coronary disturbance undoubtedly constitute a grave contraindication for important surgical interventions. The operative prognosis in the various forms of cardiac disorder must be more closely determined by continued investigations in greater numbers of patients.